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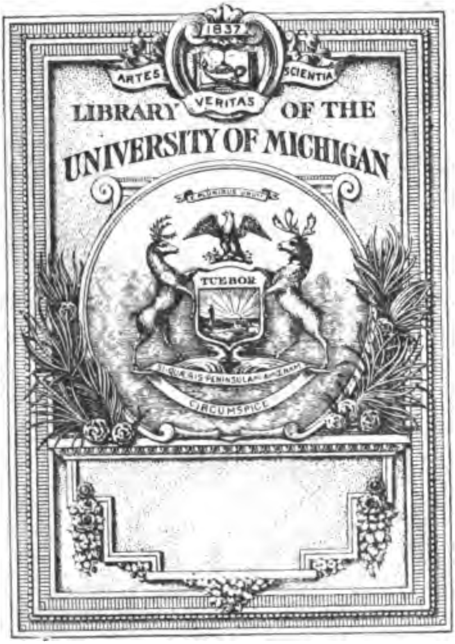
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DRILL REGULATIONS
FOR
SIGNAL TROOPS

WASHINGTON
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2

WAR DEPARTMENT,
WASHINGTON, *May 29, 1917.*

The following Drill Regulations for Signal Troops, 1917, is published for the information and government of the Army and the National Guard of the United States.

[2501151–A. G. O.]

BY ORDER OF THE SECRETARY OF WAR:

TASKER H. BLISS,
Major General, Acting Chief of Staff.

APPROVED:

H. P. McCAIN,
The Adjutant General.

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PART I.

DEFINITIONS AND GENERAL PRINCIPLES.

CHAPTER I.—DEFINITIONS.

1. **Alignment**: A straight line upon which several elements are formed, or the dressing of several elements upon a straight line.

Base: The element on which a movement is regulated or on which a formation is made.

Carriage: Any vehicle forming a part of the equipment of an organization.

Center: The middle point, or element, of a command. If the number of elements considered be even, the right center element is meant when the center element is referred to.

Column: A formation in which the elements are placed one behind the other.

Depth: The space from head to rear of any formation, including the leading and rear elements. The depth of a man is assumed to be 12 inches; that of a horse 8 feet.

Disposition: The arrangement of the elements of a command, and the formations and duties assigned to each for the accomplishment of a common purpose.

Distance: Space between elements in the direction of depth. Distance is measured mounted, from the croup of the horse in front to the head of the horse in rear; dismounted, from the back of the soldier in front to the breast of the soldier in rear.

Dress: The act of taking a correct alignment.

Element: Any component part of a larger unit.

File: Two men, the front-rank man and the corresponding man of the rear rank. The front-rank man is the **file leader.** A file which has no rear rank is a **blank file.** The term **file** applies also to individual men in single-rank formation. A single mounted man in ranks is also called a file.

File closers: Officers or noncommissioned officers placed out of ranks whose duty it is to supervise the men in ranks and see that the orders of the commander are carried out. For convenience, this term is applied to any man posted as a file closer who in dismounted formation is 2 yards in rear of the line.

Flank: The right or left of a command in line or in column; also the element on the right or left of the line.

Formation: Arrangement of the elements of a command.

Front: The space, in width, occupied by an element, either in line or column. The front of a man is assumed to be 22 inches. Front also denotes the direction of the enemy.

Guide: Any element upon which the command or any of the elements thereof regulates its march.

Head: The leading element of a command.

Interval: The lateral space between the elements or fractions of a command. Interval is measured, mounted, from the left knee of the man at the right of the open space to the right knee of the man at the left of the open space; dismounted, interval is measured on similar principles, but from elbow to elbow.

Leap frog: A method of maintaining constant communication with a moving command by using two or more instruments with a single unit, keeping one in operation while another is moving past it to a position in front. Commonly used with radio sets and buzzer instruments. The system may be used in dividing up the construction of telegraph lines.

Left: The left extremity or element of a body of troops.

Line: A formation in which the different elements are abreast of each other.

Lines of information: Channels for the transmission of military information in the field.

Maneuvers: Operations against an assumed, outlined, or actual force under a separate commander, who, within the limits of the assumed situation, is free to adopt any formations and make any movements he chooses.

Rank: A line of elements formed abreast of each other.

Right: The right extremity or element of a body of troops.

Tail: The rear element of a column, in whatever direction the column is facing.

Unit: Any group or subdivision organized for administrative or tactical purposes.

CHAPTER II.—GENERAL PRINCIPLES.

SECTION I.—INSTRUCTION.

OBJECT.

2. The legal functions of the Signal Corps include the duties of collecting and transmitting information for the Army, by telegraph or otherwise, and of devising and providing the means of so doing.

3. Signal troops are organized into units to construct, operate, and maintain the tactical and stragetical lines of information for the Army.

4. The certain and rapid transmission of information and orders from higher commanders to their subordinates, and information from subordinates to their commanding officers, regardless of difficulties, is the ultimate object in hostile operations, and is the goal to be kept constantly in view in peace training.

5. The work of signal troops is a specialty, and while it is first necessary that they become soldiers in the full sense of the term, they must, by specialization, attain a high state of practical efficiency in their technical art.

6. To meet this requirement the personnel must be thoroughly trained in all methods of signaling, and in the repair, care, and operation of the instrument used. Both officers and men must have a sufficient knowledge of map and ground to enable them to go anywhere within the field of operations without confusion or loss of time.

7. Unusual mobility is required of signal troops. Field units must be able to cover long distances as quickly as Cavalry or Field Artillery. They are often obliged to gain distance, to leave a place in column, and join a command in advance by crossing roadside ditches, making detours over difficult ground, and overcoming whatever obstacles may impose themselves.

Telegraph construction units, in going back and forth during the course of their work, are required to travel much farther than the actual distance gained, and at the same time must keep up with the march of other troops.

8. An additional object of instruction is to develop resourcefulness, initiative, and self-reliance on the part of Signal Corps men of all grades. On account of the varied conditions that are encountered in handling signal troops, no hard and fast rules can be laid down to cover all situations. Every problem which arises in service has its own best solution, and this solution must be evolved by the officer or man on the spot.

9. Normal situations can, however, be assumed, and normal methods devised for meeting them. These regulations outline the general principles according to which signal troops are to be handled, and provide a method of training organizations in their ordinary duties.

The personnel must be so thoroughly drilled in these duties that in the excitement of action they may be performed readily, naturally, and as a matter of second nature.

10. Trained troops take care of themselves and do their work through the performance of a multitude of minor details without worry or confusion.

Untrained troops are overwhelmed and discouraged by the mere details of maintaining themselves.

Minute attention to detail is the soul of military efficiency.

SEQUENCE AND METHODS.

11. A progressive order will be followed in all instruction, which should begin with the smallest unit and proceed to the larger ones in succession, culminating in field maneuvers.

12. The fact of having become proficient in any branch of work should excuse no man from the periodical study or exercise required to maintain and improve his efficiency.

13. Instructors will always be dignified, patient, maintain a proper military bearing, and by a quiet, firm demeanor set a proper example to the men.

14. Errors of judgment should always be pointed out by the proper commanders, but such errors should not be criticized harshly, as such criticism causes timidity and consequent inaction, which are generally more productive of harm than is misdirected zeal.

Faults should be corrected gradually, without nagging or shouting. Corrections should never be made in an irritating tone of voice.

Officers and noncommissioned officers should never be disciplined in the presence of their subordinates.

15. Thorough training of the individual soldier is the basis of efficiency. Great precision and attention to detail are essential to this instruction in order that the soldier may acquire that habit of implicit obedience to orders and of accurate performance of his individual duties which is indispensable in combined training.

No amount of drill of a company as a whole will produce an efficient organization if its members, including the officers, are not thoroughly instructed as individuals.

16. The instructor of each unit is habitually its immediate chief. He should be given all due latitude, and held responsible for results. The habit of self-reliance and a feeling of responsibility and pride may thus be developed among the subordinate commanders, and a healthy rivalry encouraged among units.

Each organization commander will prepare, in advance, a periodical program of instructions for his unit. The battalion program should be general in character, while that for the company should be in detail.

17. In prescribing and carrying on instruction it should be made attractive by frequent variation. Short and frequent drills are better than long ones which exhaust the attention of both instructor and pupil.

An efficient instructor not only knows his subject, but is able to hold the attention and interest of those whom he instructs.

18. While recruits should at first be occupied exclusively with preliminary instruction, their assignment to units and participation in normal fieldwork must not be delayed until preliminary instruction has been completed.

INSTRUCTION OF OFFICERS.

19. The worth of a command to the Government depends largely upon the efficiency of its officers.

20. In addition to the instruction imparted by their commanders, officers must labor ceaselessly to increase their knowledge of the conditions and necessities of modern war, and to keep abreast of the professional progress made in the technical methods and apparatus used by the Signal Corps and by the telegraph, telephone, and electrical industries of the country.

21. Signal officers should be good horsemen. They should be able to operate motor cars and motorcycles. They should acquire skill in the use of every instrument with which their organization is provided.

They should have a thorough knowledge of the organization and tactics of other arms, and should be skilled in the use of codes and ciphers.

INSTRUCTION OF SPECIAL GRADES.

22. To replace casualties in the grades of horseshoer and cook, and in the positions of clerk, bugler, mechanic, farrier, and saddler the captain will select men who have special aptitude for those duties and have them trained as understudies to those positions.

OTHER INSTRUCTION.

23. The Army Regulations should be studied in connection with these regulations as they affect all persons and organizations in the military service. Precise information on the respective subjects contained therein will be obtained from the Field Service Regulations, Tables of Organization, Manual for Courts-Martial, Small Arms Firing Regulations, Manual of Interior Guard Duty, Uniform Regulations, Rules of Land Warfare, orders and circulars issued by the War Department, and the manuals of the Signal Corps.

SECTION II.—GENERAL RULES.

24. Movements that may be executed toward either flank are explained as toward but one flank, it being necessary merely to substitute left for right, or the reverse, to have the explanation of the corresponding movement toward the other flank.

25. Any movement may be executed either from the halt or when marching, unless otherwise prescribed.

26. All movements on foot not especially excepted may be executed in double time. If the movement be from the halt, or when marching in quick time, the command **double time** precedes the command **march**; if marching in double time, the command **double time** is omitted.

27. All mounted movements not especially excepted may be executed at the trot or gallop.

28. The gait should habitually be increased or decreased progressively, the trot being executed from the walk, and the gallop from the trot. If marching at the gallop, the gait will be decreased to the trot, then to the walk, before halting; if marching at the trot, the same rule applies, halting from the trot or gallop being considered an exceptional movement.

29. To execute a movement at the trot or gallop the command **trot** or **gallop** precedes the command **march**, unless already marching at the gait desired.

30. Movements or procedures explained for the smaller units are, in general, applicable to the larger ones when under instruction of the same character, the commands being modified so as to be adapted to the particular unit dealt with.

31. The intervals and distances prescribed are in general such that, if marched by the flank from line, the elements will be in column at proper distances; or if marched by the flank from column, they will be in line at proper intervals. Similarly, if marching obliquely, a second oblique will place the elements in line or column, as the case may be, at proper intervals or distances. If, however, due to differences of length of elements, these conditions do not accurately obtain, the proper intervals or distances are gradually secured by appropriate modifications of the gait.

32. If, in forming elements abreast of each other, the commands: 1. **Company (platoon, etc.)**, 2. **HALT**, be given during the movement, only those elements halt which have reached their new positions; the others continue the march and halt on reaching their positions.

33. To stay the execution of a movement when marching, for the correction of errors, the command: 1. **In place**, 2. **HALT**, is given. All halt and stand fast. To resume the movement the command: 1. **Resume**, 2. **MARCH**, is given.

34. To revoke a preparatory command, or being at a halt to begin anew a movement improperly begun, the instructor commands: **AS YOU WERE**, at which the movement ceases and the former position is resumed.

35. Unless otherwise prescribed or announced, the guide of any subdivision in line or column is right.

To march with guide other than as prescribed above, or to change the guide: **Guide (right, left, or center).**

The announcement of the guide, when given in connection with a movement, follows the command of execution for that movement.

36. Partial changes of direction may be executed—

By interpolating in the preparatory command the word **half**, as **Column half right (left)**, or **Right (left) half turn.** A change of direction of 45° is executed.

By the command: **Incline to the right (left).** The guide, or guiding element, moves in the indicated direction and the remainder of the command conforms. This movement effects slight changes of direction.

37. If a change of formation requires a change of post of officers and noncommissioned officers, they proceed by the shortest route to their posts in the new formation.

38. While the posts of officers and noncommissioned officers are specified in the text as instructors, they go wherever their presence is necessary.

39. Officers and noncommissioned officers who are absent are replaced ordinarily by the next lower in rank. In a company chiefs of platoon are replaced by master signal electricians or by the chiefs of sections of the platoon in the order of rank. The first sergeant, if performing the duties of an officer, and the supply and stable sergeants are not replaced. Sergeants and corporals replace absent chief of section.

40. The numerical designation of units does not change as their relative order in line or column is changed.

SECTION III.—ORDERS, COMMANDS, AND SIGNALS.

ORDERS.

41. The term "order" embraces instructions or directions given orally or in writing in terms suited to the particular occasion and not in any regularly prescribed form.

42. Orders are employed only when the prescribed commands or signals are inadequate to indicate sufficiently the will of the commander.

COMMANDS.

43. A command is the will of the commander expressed in appropriate phraseology.

44. Commands are of two kinds:

Preparatory Commands and **Commands of Execution.**

45. The preparatory command, such as **Forward,** indicates the movement that is to be executed.

The command of execution, such as **MARCH** or **HALT,** causes the execution.

Preparatory commands are distinguished by **heavy-faced type,** those of **execution** by **heavy-faced CAPITALS.**

46. The commands prescribed in the text are given by the instructor except when otherwise specified.

47. To permit of the preparatory command being understood, a well-defined pause should be made between it and the command of execution. The duration of this pause depends in a measure upon the size of the body of troops under command. Ordinarily in dismounted movements and in mounted movements executed from a halt the pause should be brief and of uniform duration, as otherwise uncertainty is communicated to the ranks and a ragged execution of the movement results.

48. The tone of command is animated, distinct, and of a loudness proportioned to the number of men under command. Indifference in giving commands leads to laxity in execution.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a firm brief tone.

In mounted movements the preparatory commands are more or less prolonged to insure their being heard; the command of execution is always prolonged.

When giving commands to troops it is usually best to face or look toward them.

SIGNALS.

49. Signals are ordinarily made with the right arm, but may be made with the left when convenient.

If the saber is in the hand, the signals are made in a manner similar to that prescribed for the arm.

50. Ordinarily, before making a signal for the execution of a movement the instructor places himself where he can readily be seen, and generally with his horse facing in the same direction as those of the company. Attention, signaled by bugle or whistle, usually precedes a signal. The signals prescribed for the different movements are the **Preparatory** signals; for the signal of **execution** the arm is extended vertically and then lowered quickly to the side.

If the movement involves a change in the direction of march, the instructor moves his horse in the new direction on making the preparatory signal.

51. The following are the prescribed preparatory signals:

Attention.—Extend the arm vertically and move it slowly back and forth from right to left.

Forward.—Extend the arm vertically and lower it to the front until horizontal.

By the right (left) flank.—Extend the arm vertically and lower it to the right (left) until horizontal.

Right (left) about.—Extend the arm vertically and describe slowly a large horizontal circle with the hand; then extend the arm to the left (right) and describe a horizontal arc to front and right (left).

Right (left) oblique.—Extend the arm obliquely upward to the right (left) and front, and then lower the arm, describing a vertical circle on the right (left) side of the horse.

To increase the gait.—Carry the hand to the shoulder, forearm vertical; extend the arm vertically from this position and repeat several times.

To decrease the gait.—Hold the arm horizontally above and in front of the forehead.

To indicate an increased or decreased gait for a maneuver, the appropriate signal is made just after the preparatory signal for the maneuver.

To halt.—Extend the arm vertically and hold it there until the signal is obeyed.

To change direction to the right (left).—Extend the arm vertically; lower it to the left (right) until horizontal and describe a horizontal arc to the front and right (left).

Right (left) by section.—Point at the right (left) section and signal forward.

Right (left) front into line.—Extend the arm vertically and describe several large vertical circles on the right (left) side of the horse.

On right (left) into line.—Signal column right (left), then left (right) front into line.

Sections.—Extend the arm to the front and wave it rapidly horizontally.

Platoons.—Extend the arm to the front and wave it rapidly vertically.

Close (extend) intervals.—Indicate the base section; signal right (left) oblique. In forming line at close intervals from section column, this signal will be given just before the prescribed signals for forming line.

Right (left) into line.—Signal column right (left), then right (left) front into line.

Signals for Motorized Organizations.

General preparatory or warning signal.—Extend either arm sideward horizontally. There should be a well-defined pause between the preparatory signal and that designating the movement to be extended.

To move forward.—1. Preparatory signal. 2. Sweep the arm to the front in a horizontal position.

To halt.—1. Preparatory signal. 2. Raise the arm as nearly vertical as possible.

To park.—1. Preparatory signal. 2. Raise the arm as nearly vertical as possible and describe small horizontal circles.

PART II.

DISMOUNTED INSTRUCTION.

CHAPTER I.—GENERAL PROVISIONS.

52. Signal companies habitually turn out mounted for drills and ceremonies. At frequent intervals full field equipment will be carried. Only such dismounted instruction will be given, therefore, as is necessary for the training of recruits and for the few occasions when company formations dismounted may be required.

53. Dismounted drills are designed to teach precise and soldierly movement, and to inculcate that prompt and subconscious obedience which is essential to proper military control. To this end smartness and precision should be exacted in the execution of every detail.

54. Formations are habitually in double rank. The men always fall in at attention.

55. The interval between men in ranks is 4 inches and between ranks in flank column is 30 inches, measured from elbow to elbow. The distance between ranks is 40 inches, measured from the back of the man in front to the breast of the man in rear. The front of a man is assumed to be 22 inches, or, including the interval, 26 inches; his depth, 12 inches.

56. To secure uniformity of interval between files when falling in, and in alignments, each man places the palm of the left hand upon the hip, fingers pointing downward. In the first case the hand is dropped by the side when the next man on the left has his interval; in the second case, at the command **front.** In either case, to secure the uniformity of interval desired, it is necessary to keep the left elbow in ranks and pointing squarely away from the left side.

57. When marching in line the guide is the front-rank man on the designated flank.

When marching by the flank from line, the leading man of the front rank is, without indication, the guide of the column.

During the oblique march the leading man of the leading rank is, without indication, the guide.

CHAPTER II.—THE SOLDIER DISMOUNTED.

SECTION I.—OBJECT AND METHODS OF TRAINING.

58. This instruction has for its object the training of the individual soldier and afterwards that of the squad. It must be given with the greatest attention to detail.

59. During the instruction frequent short rests should be given, in order that the men may not be unduly fatigued.

The instructor will take advantage of these rests to instruct recruits in the customs and courtesies of the service, the duties of orderlies and the proper manner of receiving messages from and delivering them to officers, so that when the recruit is finally reported for duty he will not only know his prescribed drill thoroughly but will know how to conduct himself out of ranks as a trained soldier.

60. From the beginning the instructor will insist on a smart appearance and will require that clothing be clean and neatly adjusted.

61. The instructor explains briefly each movement, first executing it himself, if practicable. He requires the men to take the proper positions unassisted and does not touch them for the purpose of correcting them, except when they are unable to correct themselves. He avoids keeping them too long at the same movement, although each should be understood before passing to another. He exacts by degrees the desired precision and uniformity.

62. In order that all may advance as rapidly as their abilities permit, recruits are grouped according to proficiency as instruction progresses. Those who lack aptitude and quickness are separated from the others and placed under experienced drillmasters.

PHYSICAL TRAINING.

63. The physical training of the soldier must receive due attention. Its direct results are to increase the soldier's strength, agility, and endurance, and it has indirect results of far-reaching value in connection with discipline and morale. It should begin with his first instruction as a recruit and be continued throughout his entire enlistment. The methods prescribed in the authorized Manual of Physical Training will be followed with a view to making the soldier's development thorough and well balanced, and to prevent the instruction from becoming unnecessarily tedious and monotonous.

64. In the earlier phases of the instruction, and under temporary conditions that do not favor the carrying out of a more comprehensive scheme of training, special attention will be given to the setting-up exercises. Running, jumping, and swimming are phases of training of special importance to the soldier.

SECTION II.—ELEMENTARY INDIVIDUAL INSTRUCTION.

65. For preliminary instruction a number of men, usually not exceeding three or four, are formed as a squad in single rank.

POSITION OF THE SOLDIER, OR ATTENTION.

66. Heels on the same line and as near each other as the conformation of the man permits.

Feet turned out equally and forming an angle of about 45°.

Knees straight without stiffness.

Hips level and drawn back slightly; body erect and resting equally on hips; chest lifted and arched; shoulders square and falling equally.

Arms and hands hanging naturally, thumbs along the seams of the trousers.

Head erect and squarely to the front, chin drawn in so that the axis of the head and neck is vertical; eyes straight to the front.

Weight of the body sustained principally upon the balls of the feet, heels resting lightly on the ground.

TO ASSEMBLE.

67. To teach the men to assemble, the instructor requires them to place the palm of the left hand upon the hip, below the belt when worn; he then places them on the same line so th the right arm of each man rests lightly against the elbow of the man next on his right, and then directs the left hand to be replaced by the side.

When the men have learned how to take their places, the instructor commands: **FALL IN.**

They assemble rapidly as above prescribed; each man dropping the left hand as soon as the man next on his left has his interval.

TO DISMISS.

68. Being in line at a halt: **DISMISSED.**

THE RESTS.

69. Being at a halt, the commands are: **FALL OUT**; **REST**; **AT EASE**; and, 1. **Parade**, 2. **REST.**

At the command **fall out**, the men may leave the ranks, but are required to remain in the immediate vicinity. They resume their former places, at attention, at the command **fall in.**

At the command rest each man keeps one foot in place, but is not required to preserve silence or immobility.

At the command **at ease** each man keeps one foot in place, and is required to preserve silence but not immobility.

70. 1. **Parade**, 2. **REST.** Carry the right foot 6 inches straight to the rear, left knee slightly bent; clasp the hands, without constraint, in front of the center of the body, fingers joined, left hand uppermost, left thumb clasped by the thumb and forefinger of the right hand; preserve silence and steadiness of position.

71. To resume the attention: 1. **Squad**, 2. **ATTENTION.** The men take the position of the soldier.

EYES RIGHT OR LEFT.

72. 1. **Eyes**, 2. **RIGHT (LEFT)**, 3. **FRONT.**

At the command **right**, turn the head to the right oblique, eyes fixed on the line of eyes of the men in, or supposed to be in, the same rank. At the command **front**, turn the head and eyes to the front.

FACINGS.

73. To the flank, 1. **Right (left),** 2. **FACE.**

Raise slightly the left heel and right toe; face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot; place the left foot by the side of the right. **Left face** is executed on the left heel in the corresponding manner.

Right (left) half face is executed similarly, facing 45°.

To face in marching and advance, turn on the ball of either foot and step off with the other foot in the new line of direction; to face in marching without gaining ground in the new direction, turn on the ball of either foot and mark time.

74. To the rear; 1. **About,** 2. **FACE.**

Carry the toe of the right foot about a half foot-length to the rear and slightly to the left of the left heel without changing the position of the left foot; face to the rear, turning to the right on the left heel and right toe; place the right heel by the side of the left.

SALUTE WITH THE HAND.

75. 1. **Hand,** 2. **SALUTE.**

Raise the right hand smartly till the tip of the forefinger touches the lower part of the headdress or forehead above the right eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45°, hand and wrist straight; at the same time look toward the person saluted. (Two) Drop the arm smartly by the side.

STEPS AND MARCHINGS.

76. All steps and marchings executed from a halt, except right step, begin with the left foot.

77. The length of the full step in quick time is 30 inches, measured from heel to heel, and the cadence is at the rate of 120 steps per minute.

The length of the full step in double time is 36 inches; the cadence is at the rate of 180 steps per minute.

The instructor, when necessary, indicates the cadence of the step by calling **one, two, three, four**, or **left, right**, the instant the left and right foot, respectively, should be planted.

78. All steps and marchings and movements involving march are executed in **quick time** unless the squad be marching in **double time**, or unless **double time** be added to the preparatory command. Example: 1. **Squad right, double time**, 2. **MARCH.**

Quick Time and Double Time.

79. Being at a halt, to march forward in quick time: 1. **Forward**, 2. **MARCH.**

At the command **forward**, shift the weight of the body to the right leg, left knee straight.

At the command **march**, move the left foot smartly straight-forward 30 inches from the right, sole near the ground, and plant it without shock; next, in like manner advance the right foot and plant it as above; continue the march. The arms swing naturally.

80. Being at a halt, or in march in quick time, to march in double time: 1. **Double time**, 2. **MARCH.**

If at a halt, at the first command shift the weight of the body to the right leg. At the command **march**, raise the fore-arms, fingers closed, to a horizontal position along the waist line; take up an easy run with the step and cadence of double time, allowing a natural swinging motion to the arms.

If marching in quick time, at the command **march**, given as either foot strikes the ground, take one step in quick time and then step off in double time.

81. To resume the quick time. 1. **Quick time**, 2. **MARCH.**

At the command **march**, given as either foot strikes the ground, advance and plant the other foot in double time; resume the quick time, dropping the hands by the sides.

To Mark Time.

82. Being in march: 1. **Mark time**, 2. **MARCH.**

At the command **march**, given as either foot strikes the ground, advance and plant the other foot; bring up the foot in rear and continue the cadence by alternately raising each foot about 2 inches and planting it on line with the other.

Being at a halt, at the command **march**, raise and plant the feet as described above.

The Half Step.

83. 1. **Half step,** 2. **MARCH.**

Take steps of 15 inches in quick time, 18 inches in double time.

84. **Forward, half step, halt,** and **mark time** may be executed one from the other in quick or double time.

To resume the full step from half step or mark time: 1. **Forward,** 2. **MARCH.**

Side Step.

85. Being at a halt or mark time: 1. **Right (left) step,** 2. **MARCH.**

Carry and plant the right foot 15 inches to the right; bring the left foot beside it and continue the movement in the cadence of quick time.

The side step is used for short distances only and is not executed in double time.

Back Step.

86. Being at a halt or mark time: 1. **Backward,** 2. **MARCH.**

Take steps of 15 inches straight to the rear.

The back step is used for short distances only and is not executed in double time.

To Halt.

87. To arrest the march in quick or double time: 1. **Squad,** 2. **HALT.**

At the command **halt,** given as either foot strikes the ground, plant the other foot as in marching; raise and place the first foot by the side of the other. If in double time, drop the hands by the sides.

To March by the Flank.

88. Being in march: 1. **By the right (left) flank,** 2. **MARCH.**

At the command **march,** given as the right foot strikes the ground, advance and plant the left foot, then face to the right in marching (**73**) and step off in the new direction with the right foot.

To March to the Rear.

89. Being in march: 1. **To the rear,** 2. **MARCH.**

At the command **march,** given as the right foot strikes the ground, advance and plant the left foot; turn to the right about on the balls of both feet, and immediately step off with the left foot.

If marching in double time, turn to the right about, taking four steps in place, keeping the cadence, and then step off with the left foot.

Change Step.

90. Being in march: 1. **Change step,** 2. **MARCH.**

At the command **march,** given as the right foot strikes the ground, advance and plant the left foot; plant the toe of the right foot near the heel of the left and step off with the left foot.

The change on the right foot is similarly executed, the command **march** being given as the left foot strikes the ground.

SECTION III.—ELEMENTARY COLLECTIVE INSTRUCTION.

THE SQUAD.

91. As soon as soldiers are sufficiently instructed for the purpose, they are formed into squads of convenient size in order to teach them the principles of alignments, taking intervals, the marchings and the turnings.

Ordinarily a squad should not contain more than eight men.

92. For this instruction the men are formed in double rank. The files on the right and left of the squad are always complete; if there be one incomplete file, it will be second from the left.

The rear-rank men cover their file leaders accurately at 40 inches distance.

When the number of men under instruction is less than six, they will be formed in single rank. The movements described for the double-rank formation apply equally well to the single rank, omitting the explanations for the rear-rank men.

TO FORM THE SQUAD.

93. To form the squad, the instructor designates a man as the front-rank man of the right file and indicates to him where the right of the squad is to rest; he then places himself about 3 yards in front of where the center is to be formed, and commands: **FALL IN.**

The men form on the designated file, in two ranks, facing to the front, as already prescribed. (Par. 67.)

94. The squad executes **the rests**; resumes **the attention**; **marks** time, and executes **the facings**, **the steps**, and **the halt**, and is dismissed by the same commands and means as explained under Section II.

ALIGNMENTS.

95. The alignments are first taught by requiring the men to align themselves upon two files establishsed as a base.

Being at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few paces, and establishes them as a base; he then commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT.**

At the command dress, the first two files execute eyes right, and place the left hand upon the hip. The remaining files march to the front, each man shortening the last step so as to place himself about 6 inches in rear of the new alignment, which should never be passed; each man then executes eyes right, places the left hand upon the hip, whether dressing to the right or left, and taking steps of 2 or 3 inches moves up and places his right arm lightly against the elbow of the man on his right, so that his eyes and shoulders are in line with those of the men on his right.

The instructor verifies the alignment of both ranks from the right flank, and orders up or back such men as may be in rear or in advance of the line; only the men designated move.

At the command front, given when the ranks are aligned, each man turns his head and eyes to the front and drops his left hand by the side.

96. At first, the basis of the alignment is established parallel to the front of the squad; afterwards, in oblique directions.

97. The men having learned to align themselves, the instructor establishes the base file and commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT.**

At the command dress, the men, except the base file, move forward and all dress as previously explained, the rear-rank men being careful to cover their file leaders accurately.

98. Alignments to the rear are executed on the same principles: 1. **Right (left) backward**, 2. **DRESS**, 3. **FRONT.**

The men step back, halt a little in rear of the line, and immediately dress up as previously explained.

99. To execute the alignments, using the side step, the instructor establishes the base file a short distance to the right or left of the squad, and commands: 1. **Right (left) step**, 2. **(Right or left)**, 3. **DRESS**, 4. **FRONT.**

At the command dress, the men execute the side step, close toward the base file, and dress as previously explained.

TO TAKE INTERVALS AND DISTANCES; TO ASSEMBLE.

100. Being in line at a halt: 1. **Take interval**, 2. **To the right (left)**, 3. **MARCH**, 4. **Squad**, 5. **HALT.**

At the second command the rear-rank men march backward 4 steps and halt; at the command march all face to the right and the leading man of each rank steps off; the other men step off in succession, each following the preceding man at 4 paces, rear-rank men marching abreast of their file leaders.

At the command halt, given when all have their intervals, all halt and face to the front.

101. Being at intervals, to assemble the squad: 1. **Assemble, to the right** (left), 2. **MARCH.**

The front-rank man on the right stands fast, the rear-rank man on the right closes to 40 inches. The other men face to the right, close by the shortest line, and face to the front.

102. Being in line at a halt: 1. **Take distance,** 2. **MARCH,** 3. **Squad,** 4. **HALT.**

At the command march the man on the right of the front rank moves straight to the front; the other men of the front rank, in order from right to left, and then those of the rear rank, in the same order, move straight to the front, each stepping off so as to follow the preceding man at 4 paces. The command halt is given when all have their distances.

103. Being at distances, to assemble: 1. **Assemble,** 2. **MARCH.**

The man originally on the right of the front rank stands fast; the others move forward to their positions in line.

MARCHINGS.

To March to the Front.

104. Being at a halt: 1. **Forward,** 2. **MARCH.**

The men step off and march straight to the front.

If in line, the rear-rank men follow their file leaders accurately. The instructor sees that the ranks preserve the alignment of the intervals toward the side of the guide. The men yield to pressure from that side and resist pressure from the opposite side; by slightly shortening or lengthening the step they gradually recover the alignment, and by slightly opening out or closing in they gradually recover the interval, if lost; while habitually keeping the head to the front, they may occasionally glance toward the side of the guide to assure themselves of the alignment and interval, but the head is turned as little as possible for this purpose.

To March to the Rear.

105. Being in march: 1. **To the rear,** 2. **MARCH.**

Executed as explained in paragraph 89.

If at a halt, the squad may be faced about and then moved forward, as explained in the preceding paragraph; or, witho facing about, it may be marched a short distance to the rear, as explained in paragraph 86, by the command: 1. **Backward**, 2. **MARCH.**

Whenever the squad in line is faced about or marched to the rear, all men in the front rank not covered step into the new front rank.

To March by the Flank.

106. Being in line: 1. **By the right (left) flank**, 2. **MARCH.**

Executed as explained in paragraph 88.

The formation obtained by marching by the flank from line is called a **flank column.**

If at a halt, the squad may be marched by the flank by first facing it in the desired direction and then moving it forward, as explained in paragraph 79.

The Oblique March.

107. For instruction, the squad being in column or correctly aligned, the instructor causes the squad to face half right or half left, points out to the men their relative positions, and explains that these are to be maintained in the oblique march.

108. 1. **Right (Left) oblique**, 2. **MARCH.**

Each man steps off in a direction 45° to the right of his original front. He preserves his relative position, keeping his shoulders parallel to those of the guide (the man on the right front of the line or column), and so regulates his steps that the ranks remain parallel to their original front.

At the command **halt** the men halt faced to the front.

To resume the original direction: 1. **Forward**, 2. **MARCH.**

The men half face to the left in marching and then move straight to the front.

If at **half step** or **mark time** while obliquing, the oblique march is resumed by the commands: 1. **Oblique**, 2. **MARCH.**

To Turn on Moving Pivot.

109. Being in line: 1. **Right (Left) turn**, 2. **MARCH.**

The movement is executed by each rank successively and on the same ground. At the second command, the pivot man of the front rank faces to the right in marching and takes the half step; the other men of the rank oblique to the right until opposite their places in line, then execute a second right oblique and take the half step on arriving abreast of the pivot man. All glance toward the marching flank while at half step and take the full step without command as the last man arrives on the line.

Right (Left) half turn is executed in a similar manner. The pivot man makes a half change of direction to the right and the other men make quarter changes in obliquing.

To Turn on Fixed Pivot.

110. Being in line, to turn and march: 1. **Squad right (left),** 2. **MARCH.**

At the second command, the right flank man in the front rank faces to the right in marching and marks time; the other front rank men oblique to the right, place themselves abreast of the pivot, and mark time. In the rear rank the third man from the right, followed in column by the second and first, moves straight to the front until in rear of his front-rank man, when all face to the right in marching and mark time; the remaining men of the rear rank move straight to the front four paces, oblique to the right, place themselves abreast of the men on their right, cover their file leaders, and mark time.

Men on the new line glance toward the marching flank while marking time and, as the last man arrives on the line, both ranks execute **forward march**, without command.

111. Being in line, to turn and halt: 1. **Squad right (left),** 2. **MARCH,** 3. **Squad,** 4. **HALT.**

The third command is given immediately after the second. The turn is executed as prescribed in the preceding paragraph except that all men, on arriving on the new line, mark time until the fourth command is given, when all halt. The fourth command should be given as the last man arrives on the line.

CHAPTER III.—INSTRUCTION WITH ARMS.

SECTION I.—GENERAL PROVISIONS.

112. The duties of Signal troops pertain essentially to the service of information. Their sole arm is the pistol, which is furnished as a means of self-defense at such times when the scope of their duty carries them beyond the protection of troops of the line.

113. Thorough training in the manual of the pistol and careful instruction in dismounted fire action should therefore be given to insure the acquisition of that self-reliance and morale necessary for the performance, unassisted if necessary, of their proper functions.

114. Both before and after drill or other exercise with the pistol, remove the magazine to see that it is empty and draw back the slide and examine the bore to see that the pistol is not loaded.

115. Before commencing instruction in the manual, the soldier should be made familiar with the mechanism of the pistol, the names of the principal parts, and the method of cleaning, assembling, and operating it.

116. When a lanyard is used the snaps are attached to the butt of the pistol and the magazine, the lanyard is passed over the head, and the sliding loop drawn snug against the right armpit. The lanyard should then be of just such length that the arm can be extended without constraint.

117. For dismounted instruction with the pistol, the men may be with or without intervals.

118. Except in the act of firing, the automatic pistol, when actually on the person, whether loaded or unloaded, will be carried cocked and locked. At all other times the hammer will be lowered fully down.

119. Instruction in firing will conform to the regulations prescribed in the Small Arms Firing Manual.

SECTION II.—MANUAL OF THE PISTOL.

120. The pistol being in the holster, to raise pistol: 1. **Raise,** 2. **PISTOL.**

Raise: Unbutton the flap of the holster with the right hand and grasp the stock, back of the hand outward.

PISTOL: Draw the pistol from the holster; reverse it, muzzle up, the hand holding the stock with the thumb and last three fingers, forefinger outside the guard, barrel to the rear and inclined to the front at an angle of 30°, hand as high as the neck and 6 inches in front of the point of the right shoulder. This is the position of **raise pistol.**

121. Being at **raise pistol,** to inspect pistol: **1. Inspection,** 2. **PISTOL.**

(a) **When a magazine is in the pistol:** Push down the safety lock and lower the right hand to within easy reach of the left; pistol pointed upward and to the right front at an angle of about 30°; grasp the corrugations of the slide with the left thumb and forefinger, thumb to the right; thrust upward with the right hand, thus drawing back the slide until the slide stop is engaged; resume **raise pistol.**

(*b*) **When no magazine is in the pistol:** Push down the safety lock and lower the pistol to the left hand, rotating the pistol so that the sights move to the left, barrel pointing downward and to the left front, stock pointing upward and to the right front; with the left thumb and forefinger grasp the corrugations of the slide, back of the left hand down; change the grasp of the right hand slightly until the thumb presses against the rounded surface of the slide stop; thrust downward and to the left front with the right hand, thus drawing back the slide, and at the same time press the slide stop with the right thumb against the slide until it engages; resume **raise pistol.**

Inspection pistol is never executed with a loaded pistol or with a loaded magazine in the pistol.

122. 1. **Return,** 2. **PISTOL.**

(*a*) Being at **raise pistol;** lock the pistol, if not locked; lower the pistol to the holster, reversing it, muzzle down, back of the hand to the right; raise the flap of the holster with the right thumb; insert the pistol in the holster and thrust it home; button the flap of the holster with the right hand.

(*b*) Being at **inspection pistol** (with a magazine in the pistol); lower the pistol to the left hand and grasp the slide as prescribed for inspection pistol without magazine (par. **121** (*b*));

thrust downward and to the left front with the right hand, thus relieving the pressure on the slide stop, and at the same time disengage the slide stop with the right thumb; release the slide; reverse and lock the pistol; place it in holster as prescribed in (*a*). If there is no magazine in the pistol, lower it to the bridle hand as in **load** (par. **124**); draw back the slide and release it; lock the pistol and place it in the holster.

When the last shot is fired the slide stop engages automatically. **Return pistol** is then executed as from inspection pistol (*b*).

123. Being at raise pistol, to insert a magazine in the **pistol**: 1. **Insert,** 2. **MAGAZINE,** or 2. **LOADED MAGAZINE.**

(*a*) When a magazine is in the pistol: Lower the pistol into the left hand, rotating it so that the sights move to the left; grasp the slide with the left hand, back of the hand down, barrel pointing downward to the left front, stock pointing upward to the right front; release the magazine catch with the middle finger of the left hand; withdraw the magazine with the right hand; insert the designated magazine and resume **raise pistol.** If there be no empty space in the magazine pocket when the magazine is withdrawn from the pistol, the magazine may be held between the left thumb and the stock of the pistol until the magazine has been taken from the pocket and inserted; the magazine withdrawn from the pistol is then inserted in the magazine pocket.

Whenever the magazine catch is released, the right hand should be so placed as to limit the motion of the magazine and prevent its falling out.

(*b*) **When no magazine is in the pistol:** Lower the pistol into the left hand and grasp it as before; insert the designated magazine and resume **raise pistol.**

A loaded magazine will never be inserted without specific command.

124. Being at **raise pistol** with a loaded magazine in the pistol, to load: **LOAD:** Push down the safety lock and lower the pistol to the bridle hand as prescribed for inspection pistol when a magazine is in the pistol (par. **121** (*a*)); operate the slide; engage the safety lock with the right thumb and raise pistol.

To simulate loading for instruction, first withdraw the empty magazine.

The command load may be given in connection with the insertion of the magazine, for example: 1. **Insert,** 2. **LOADED MAGAZINE;** 3. **LOAD.**

After inserting magazine, reverse the pistol and load as above prescribed.

125. Being in any position, to eject the cartridge from the receiver: **UNLOAD.**

Pass the pistol into the left hand as in **insert magazine;** release the magazine catch with the middle finger of the left hand, slightly disengaging the magazine; push down the safety lock with the right thumb; operate the slide to eject the cartridge; engage the magazine; raise and lock the pistol.

126. Being in any position, to withdraw the magazine from the pistol: **WITHDRAW MAGAZINE.**

Handle the pistol as in **insert magazine;** release the magazine catch; withdraw the magazine and execute **raise pistol.**

Recruits are taught the motions of loading and firing without cartridges, and preferably without a magazine in the pistol, to avoid wear on the magazine lips. Loading and pointing practice should be had at all gaits.

127. The hammer is always lowered preparatory to placing the pistol in the arm rack or other place of deposit.

128. Being at **raise pistol,** to lower the hammer:

(*a*) **Using both hands:** Push down the safety lock; assume the position of **load;** seat the right thumb firmly on the hammer and hold it there; raise the left hand to the right and press the grip safety with the left thumb; insert the forefinger inside the trigger guard; press the trigger and carefully let the hammer down with the right thumb. Resume **raise pistol.**

(*b*) **Using but one hand:** Raise the right hand until the muzzle of the pistol is well above the head; disengage the safety lock; seat the ball of the right thumb firmly on the hammer; bear down the grip safety by pressure on the hammer; press the trigger and carefully let down the hammer with the right thumb.

129. To charge the magazine: Hold the magazine in the left hand, open end up, rounded side to the right. Take the cartridge in the right hand, thumb on the rim, bullet end pointing to the right; place the rim on the end of the magazine follower; force down the magazine spring and slip the cartridge to the left of the magazine. The next cartridge is similarly slipped in by placing it on the cartridge just inserted and forcing down the spring.

The magazine may be charged with any number of cartridges from one to seven.

Before dismissing the squad, pistols will be inspected, and if found loaded, will be unloaded and magazines withdrawn to prevent loaded or partially loaded magazines being left in the pistol. Except at target practice, on guard duty, or active service, the pistol is habitually carried unloaded with empty magazine.

SECTION III.—TO FIRE.

180. Being at raise pistol, **to fire**: With the right thumb release the safety lock, if in the locking position; extend the arm, bringing the sights on the target, and press the trigger.

The energy of recoil causes the mechanism of the pistol to eject the empty cartridge case, load, and prepare the pistol for the next shot. Pressure must be entirely relieved from the trigger after each shot in order that the trigger may reengage the sear. At the firing of the last cartridge, as the slide moves to the rear, it is automatically locked in the open position by the slide stop, thus calling attention to the fact that the magazine is empty.

181. To reload after firing out a magazine: Remove the magazine, insert a charged one, and release the slide stop with the left hand.

182. To exercise the squad in collective firing, either actual or simulated: 1. **At (such an object)**, 2. **Ready**, 3. **Squad**, 4. **FIRE**.

At the command **ready**, the pistols are cocked or the **safety** latches are released. At the command **fire**, each man aims and fires by steadily increasing the pressure of his grip. It is important that no attempt be made to pull the trigger.

CHAPTER IV.—THE COMPANY DISMOUNTED.

SECTION I.—GENERAL PROVISIONS.

183. The instruction herein prescribed is applicable only in a general way to any particular type of signal company. Necessary modifications will be made by company commanders when occasion demands. Dismounted drill for platoon or section will simulate that for the company as far as practicable.

184. The organization of the various signal companies as well as the subdivisions thereof, will be found in the chapters dealing with the several companies.

The company is formed in double rank, with the platoons and sections arranged from right to left in order of their permanent numbers.

185. The lieutenants are assigned as platoon commanders in numerical order beginning with the senior.

Chiefs of platoons and sections supervise the movements of their platoons and sections, but repeat or give commands only when prescribed.

File closers rectify mistakes and insure steadiness and promptness in the ranks.

186. The company or any subdivision thereof executes the **halt, rests, facings, steps** and **marchings, takes intervals** and **distances** and **assembles,** resumes **attention, obliques,** resumes direct march and preserves alignments as prescribed under the soldier dismounted and the squad, substituting the commands company (or proper subdivision) for squad.

SECTION II.—POST OF OFFICERS, NONCOMMISSIONED OFFICERS, ETC., IN LINE.

187. The captain: Four yards in front of the center of the company.

Chiefs of platoons: Two yards in front of the center of their platoons.

Master signal electricians: In the line of file closers opposite the center of the company.

First sergeant: In the front rank, 1 yard from the right of the first section.

Chiefs of sections: One yard in front of the center of their sections.

Sergeants: In the front rank on the right of their sections, not covered in the rear rank.

Supply stable or mess sergeants: In line of file closers on left of master signal electrician, posted from right to left in order of rank.

Corporals: In the front rank of their sections, as right and left files.

Guidon and musicians: In line of file closers of first section.

Mechanics, cooks, etc., when present, are assigned to the various sections.

In flank column the posts are the same as when faced with the company from line.

138. The rules designating the positions of officers and noncommissioned officers are general in nature and will be followed only in those companies where no specific dismounted formation of subdivisions is hereinafter prescribed.

Whenever "section" or "chief of section" is referred to in these Regulations "platoon" or "assistant chief of platoon," respectively, are intended when considering the outpost company.

SECTION III.—CLOSE ORDER.

TO FORM THE COMPANY.

139. At the sounding of the assembly, the first sergeant, facing the company, and 6 yards in front of where the center is to be, commands: 1. **Fall in**, 2. **Call rolls**, 3. **REPORT**.

At the command **fall in**, the sergeants place themselves on the line facing to the front, in their proper order, at sufficient distance apart for the formation of their sections. The men of each section fall in on the left of their sergeants, as prescribed in paragraph 93; the chiefs of sections take their posts, facing their sections, and the guidon and the file closers, except the master signal electricians, take their posts. The assembly having ceased, the first sergeant causes the sections to close to the right, if necessary.

At the command **call rolls**, the chiefs of sections call the rolls and then face to the front.

At the command **report**, the chief of the first section salutes and reports, "**First section present**," or "**First section, Corporal ——— and Private ——— are absent.**" The first sergeant, having received and verified the report, returns the salute. The chief of the second section then reports in like manner, and so on. Men who are known to be absent by proper authority are not reported absent by the chiefs of sections. After receiving the reports the first sergeant faces about, salutes the captain and reports, "**Sir, the company is present** or **accounted for**," or "**Sir**, (so many) **noncommissioned officers** or **privates are absent.**" The first sergeant then takes his post. The captain places himself about 12 yards in front of the center of the company, superintends the formation, and receives the report of the first sergeant, whose salute he returns. The lieutenants and master signal electricians take their posts as soon as the first sergeant has reported. During instruction the officers have the saber drawn or in the scabbard, at the discretion of the captain. When the captain draws saber the lieutenants also will draw sabers.

ALIGNMENTS.

140. The alignments are executed as prescribed for the squad, the guide being established instead of the base file. In aligning the company, the captain places himself in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made; after commanding **FRONT** he resumes his post.

TO DISMISS THE COMPANY.

141. Being in line at a halt the captain directs the first sergeant: **Dismiss the company**, and returns the salute of the first sergeant.

The officers and master signal electricians fall out; the first sergeant salutes, steps 3 yards to the front, faces to the left, and commands: **DISMISSED.**

In exceptional cases the company may be dismissed from any formation, either at a halt or marching.

PART III.

MOUNTED INSTRUCTION.

CHAPTER I.—GENERAL PROVISIONS.

SECTION I.—OBJECT.

145. The object of this instruction is to teach horsemanship to the extent necessary to enable detachments and companies of the Signal Corps to perform efficiently the mounted duties required of them.

This object can be considered as attained only when all members of a command are thoroughly proficient—

(*a*) In equitation and driving or packing.

(*b*) In the care, management, and conditioning of horses and mules.

(*c*) In saddling and harnessing; in fitting, cleaning, and caring for all articles of animal equipment pertaining to the command.

146. Throughout the course of mounted instruction it should be constantly borne in mind that the highest attainments as to technical efficiency count for naught, unless organizations possess a proper degree of mobility. They must be able to keep the road day after day without strength being reduced by avoidable casualties among men and animals. All mounted instructions should point to the development of the above quality.

SECTION II.—SEQUENCE OF INSTRUCTION.

147. A systematic and progressive sequence of instruction based upon sound, fundamental principles is a matter of the greatest importance. An instructor who does not have clearly defined and correct ideals and who does not understand the results to be attained and the methods to be employed will spoil both men and animals.

man, and will be in accordance with Section VI below and with the authorized manuals dealing with the subject.

SECTION III.—METHODS OF INSTRUCTION AND RULES FOR INSTRUCTORS.

154. An instructor in equitation and horsemanship should, whenever possible, be a skilled and experienced horseman and one who has a great interest in the work. He should be well mounted and the condition of his animal and equipment, as well as the adjustment of the latter, should furnish a model in all particulars for those undergoing instruction.

The instructor will habitually be mounted. For the first lessons, however, it may be advantageous for him to remain on foot so as to better explain movements and correct faults.

155. During the drills the following rules for the care of animals are explained and emphasized until the instructor is satisfied by means of questions that they are thoroughly comprehended:

Never threaten, strike, or otherwise abuse a horse.

Before entering a stall or when approaching a horse, particularly from the rear, speak to him gently.

Never take a rapid gait until the horse has been warmed up by gentle exercise.

Never put up a horse brought to the stable or picket line in a heated condition, but throw a blanket over him and rub his legs, or walk him until cool. When he is wet, put him under shelter, and rub him until dry.

Never feed grain to a horse when heated. Hay will not hurt a horse, no matter how warm he may be.

Never water a horse when heated unless the exercise or march is to be immediately resumed.

Never throw water over any part of a horse when heated.

Never allow a horse's back to be cooled suddenly by washing or even removing the blanket unnecessarily.

To cool the back gradually, the blanket may be removed and replaced with the dry side next the horse.

156. Steady, well-trained horses are selected for the first lessons. The soldiers exchange horses from time to time during the lesson on indication from the instructor. Especially in the beginning must the instructor be careful to match rider and horse according to the aptitude of the former. Later on, horsemanship is promoted by gradually increasing the difficulties of the task and by making more frequent changes in the assignment of horses.

157. The soldier will be taught that his own disposition or temper is usually communicated to and reacts upon the horse, and therefore it is to their mutual interest to preserve calmness.

A feature of all instruction work should be its quietness.

158. The instructor must first develop the confidence of the soldier, give him a proper seat, and make him supple on the horse. Progress should be suited to his capacity and should exempt him as far as practicable from falls or other accidents. Instruction in the use of the aids and in the means employed to train the horse to obey them, will follow.

Instruction is given individually; every new movement is made the subject of a particular lesson given to each soldier in turn.

During the exercise the instructor avoids general remarks and, in so far as possible, unfamiliar terms; in the correction of faults he addresses by name those committing them.

He passes frequently from one soldier to another giving advice and endeavoring to impress upon the men the principles embodied in the regulations. In doing this he need not use the language of the text.

There should be frequent rests, especially with recruits. During these rests advantage may be taken of the opportunity to question the men respecting the instruction they have received.

In all exercises the instructor varies the gait so as not to weary men or horses. The instruction is conducted without hurry. The daily work begins and ends at the walk.

159. During the early instruction greater progress will be made and better results accomplished by work in the riding hall or outdoor riding court, because the horses go more quietly, the nervousness natural to beginners is greatly lessened, and there is nothing to distract the attention of men and horses. When weather permits, the outdoor riding court is preferable to the riding hall.

When a riding hall or riding court is not available, as in camp or in the field, the work may be conducted in an outdoor rectangle, the corners of which are marked by elevated and conspicuous objects, and constructed of such material as not to injure a horse or rider that collides with them. Such a rectangle should be of sufficient dimensions to enable the riders to exercise with freedom while remaining under the eye of the instructor and within reach of his voice. The instructor changes the ground as soon as the tracks are worn to the extent that the horses follow them mechanically. He avoids placing his rectangle parallel to adjacent rectangles, roads, paths, or fences, so that from the first the rider is compelled to direct his horse.

In early lessons the men lead their horses to the place of instruction and return them to the stable in the same manner. When they have received sufficient instruction they go and return mounted.

As soon as the riders have acquired sufficient confidence in their seat and in their ability to stay on a horse, riding on a rectangle of extended dimensions and short road marches should be undertaken.

160. An instructor can handle to best advantage a class of 12 to 20 men. Instruction becomes imperfect and unsatisfactory when the number exceeds 30. It will generally be found advisable to have this work performed by platoon, under direction of platoon chiefs.

161. In the later periods of instruction road marches and cross-country riding should be undertaken, gradually increasing the requirements and difficulties. In the beginning they should take place once and toward the last at least twice per week. During these outdoor exercises riding in long lines, with extended and irregular intervals over broken ground, is the most productive of good results, because it teaches both rider and horse self-reliance, confidence, and initiative. The platoon should be frequently broken up and the riders sent home or to some designated rendezvous by pairs over different routes.

During the more advanced training out of doors every occasion should be utilized to instruct the men in the care and saving of the horse, the proper tempo or cadence of the different gaits and their use, depending upon the nature ground, as well as elementary instruction in orientati reading, carrying messages, and making reports.

162. A lesson period for the riding school should two and one-half hours, divided as follows:

Forming on the company parade, marching to stable line, saddling, bridling, leading out, and reporting mo formed at the riding school—20 minutes.

Actual work under the eye of the instructor— minutes.

Returning to the stable or picket line, unsaddling, caring for equipment, grooming, watering, leading in ing to the company parade for dismissal—40 minut

The time of the actual work in the riding school be reduced to less than 1 hour; for road march country riding the minimum should be 2 hours. A be impressed with the fact that the proper tim horses and equipment is immediately after their

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its peg

TO FOLD THE SADDLE BLANKET.

166. The blanket, after being well shaken, will be folded into six thicknesses, as follows: Hold it well up by two adjacent corners, the longer edges vertical; double it lengthwise, so the fold will come between the "U" and "S," the folded corner in the left hand; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket extended between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds, seize the double folded corner; turn the left, disengaged corner in and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds, grasp the corners and shake the blanket well in order to smooth the folds; raise the blanket and hold the upper edge between the chin and breast; slip the hands down halfway, the first two fingers outside, the other fingers and thumb of each hand inside; seize the blanket with the thumbs and first two fingers, let the part under the chin fall forward; hold the blanket up, arms extended, even the lower edges; retake the middle points between the thumb and forefinger and flirt the outside part over the right arm.

The blanket is thus held before placing it on the horse.

TO PUT ON THE BLANKET AND SURCINGLE.

167. The instructor commands: **BLANKET.**

Approach the horse on the left side, with the blanket folded and held as just described; place it well forward on his back by tossing the part of the blanket over the right arm to the right side of the horse, still keeping hold of the middle points; slide the blanket once or twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward; place the blanket with the forefinger of the left hand on the withers, and the forefinger of the right hand on the backbone, the blanket smooth; it should then be well forward with the edges on the left side; remove the locks of mane that may be under it; pass the buckle end of the surcingle over the middle of the blanket and buckle it on the near side a little below the edge of the blanket.

168. The saddle now issued is the McClellan saddle, as shown in Plate 1.

169. The bridle now issued is the double bridle, model 1909, as shown in Plate 2.

TO SADDLE.

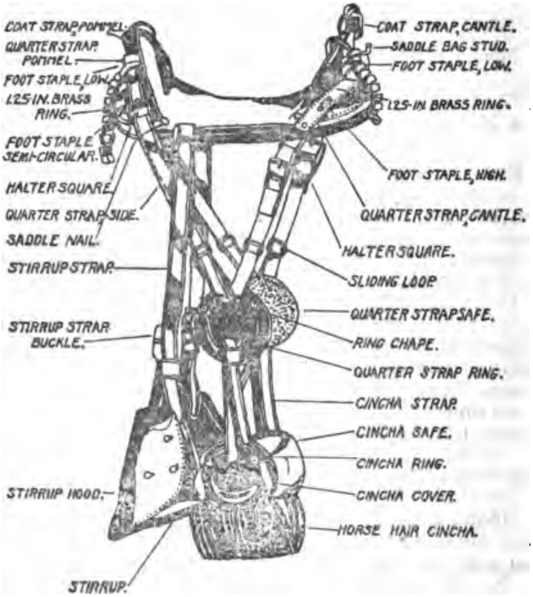
170. For instruction, the saddle may be placed 4 yards in rear or in front of the horse. The stirrups are crossed over the seat, the right stirrup uppermost; the cincha and cincha strap are crossed above the stirrups, the strap uppermost.

The blanket, without the surcingle, having been placed as previously explained, the instructor commands: **SADDLE.**

Seize the pommel of the saddle with the left hand and the cantle with the right; approach the horse on the left side from the direction of the croup and place the center of the saddle on the middle of the horse's back, the front ends of the side bars about three finger widths behind the points of the shoulder blades; let down the cincha strap and cincha; pass to the right side, adjust the cincha and straps and see that the blanket is smooth; return to the left side, run the left hand, back up, down the withers so as to raise the blanket slightly under the pommel arch, in order that the withers may not be pinched or pressed upon; take the cincha strap in the right hand, reach under the horse and seize the cincha ring with the left hand, pass the end of the strap between the ring and safe and through the ring, then up through the upper ring from the outside; if necessary, make another fold in the same manner.

The strap is fastened as follows: Pass the end through the upper ring to the front and seize it with the left hand; place the fingers of the right hand between the outside folds of the strap; pull slowly from the horse with the right hand and take up the slack with the left; cross the strap over the folds, pass the end of it, with the right hand, underneath and through the upper ring back to the folds, then down and under the loop that crosses the folds and draw it tightly; secure the end of the strap.

Another method of fastening the cincha strap is as follows: Pass the end through the upper ring to the rear; seize it with



GUIDON STIRRUP.

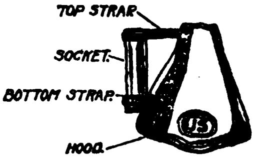


PLATE 1.—THE McCLELLAN SADDLE.

the right hand, place the fingers of the left between the outer folds of the strap; pull slowly from the horse with the left hand and take up the slack with the right; pass the end of the strap underneath and draw it through the upper ring until a loop is formed; double the loose end of the strap and push it through the loop and draw the loop taut. The free end should then be long enough conveniently to seize with the hand.

Having fastened the cincha strap, let down the right stirrup, then the left.

The surcingle, if used, is then buckled over the saddle, and should be a little looser than the cincha.

In saddling the horse the cincha must be tightened gradually, and not with violence, a practice that if persisted in renders a horse ill tempered and mean in saddling.

FITTING THE SADDLE.

171. Great care must be taken in the fitting and adjustment of saddles, to prevent sore backs.

There are six axioms in saddle fitting:

1. The withers must not be pinched nor pressed upon.
2. The central line of the back must have no pressure put upon it.
3. The shoulder blades must have full and unhampered movement.
4. The loins must not carry weight.
5. The weight must be put upon the ribs through the medium of the muscles covering them.
6. The weight must be evenly distributed over a surface which extends from the play of the shoulders to the last true rib.

To fit the saddle: (*a*) The saddle, without blanket, is placed in its proper position on the back. It should be noted whether the upper or lower edges or the front or rear of the side bars gouge into the back at any place. If this occurs or if the saddle when lifted from the back a distance corresponding to the thickness of the blanket otherwise fails perceptibly to conform to the outlines of the back, the test and remedy described under (*e*) should be made and applied.

(*b*) The existence of wither pressure is determined by blanketing and saddling the horse and placing an assistant in the saddle. The hand is run over the top and along both sides of the withers beneath the blanket. To make the test effective the man in the saddle should lean forward, and the examiner should not be satisfied with anything less than the introduction of his entire hand.

(*c*) It is noted that the central line of the back and also that the loins bear no weight even when the assistant in the saddle leans to the front, rear, or either side.

(*d*) To determine if the blade bones have unhampered movement, the hand is passed underneath the blanket from the front until the play of the shoulder blade can be felt. The fore leg is raised and advanced to its full extent to the front by an assistant while the hand is in this position. If this can be done while the man in the saddle is leaning forward without pinching the fingers between the side bars and the shoulder blade, the fit in this respect is satisfactory. The test should be made on both shoulders. If the fingers are pinched, the blade bones will also be pinched and the action of the horse restricted. To correct the difficulty the saddle must be raised, assuming that it is at the proper place on the back, by placing under it a greater thickness of blanket or by attaching pieces of felt under the side bars.

(*e*) To ascertain whether the pressure of the side bars is evenly distributed the saddle is ridden in for half an hour or more. On completion of the ride the saddle is carefully ungirthed and lifted from the blanket without disturbing the latter in any way. The blanket will be found to bear the imprint of the side bars, and an examination of this depression will show at a glance whether the bars press evenly from top to bottom and from front to rear. This examination must be made quickly, as the elasticity of the blanket soon causes it to lose the impression of the side bars. Any irregularity in the fit of the side bars may be remedied by the introduction of pieces of felt to fill up the spaces between the side bars and the blanket. With very little practice these pieces of felt may be cut to the required shape and thickness with a very sharp knife. Some edges will need to be as thin as a knife edge; other parts may require the addition of more than one thickness. After determining where these pieces of felt are to rest they are attached to the side bars with glue and bound in place by sheepskin tacked to the side bars. The most radical alterations in the fit of the side bars can in this manner be affected. The method is simple and quick and can easily be performed by the average saddler.

(*f*) The cincha should be sufficiently tight to keep the saddle in its place and no tighter. Generally speaking, correct cinching has been obtained when the flat of the hand is easily admitted under the quarter ring safe. With most horses after exercising for a while the chincha will be found too loose, and should be taken up.

A tight cincha restricts the animal's breathing and also brings too much pressure upon and strangles the tissues. Especially is this apt to be the case under the quarter and cincha ring safes, when strangulations soon causes lumps, puffs, and sores.

(*g*) Care is taken that the quarter straps are so adjusted and the cincha so selected that the cincha ring safe will be a sufficient distance from the quarter ring safe to avoid pinching and galling the skin between them.

TO REMOVE THE SADDLE.

172. The instructor commands: **UNSADDLE.**

Stand on the left side of the horse; unbuckle and remove the surcingle, if in use; cross the left stirrup over the saddle; loosen the cincha strap and let down the cincha; pass to the right side, cross the right stirrup, then the cincha over the saddle; pass to the left side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, and remove the saddle over the croup and place it in front or rear of the horse, as may be directed, pommel to the front; grasp the blanket at the withers with the left hand and at the loin with the right, remove it in the direction of the croup, the edges falling together, wet side in, and place it across the saddle, folded edge on the pommel, marked side of blanket uppermost; if in the stable, place the saddle on its peg when taken off the horse.

TO PUT ON THE DOUBLE BRIDLE.

173. The instructor commands: **BRIDLE.**

Take the double reins in the right hand, the crownpiece in the left; approach the horse on the left side; slip the reins over his head, letting them rest on his neck; take the crownpiece in the right hand and the lower left branch of the curb bit in

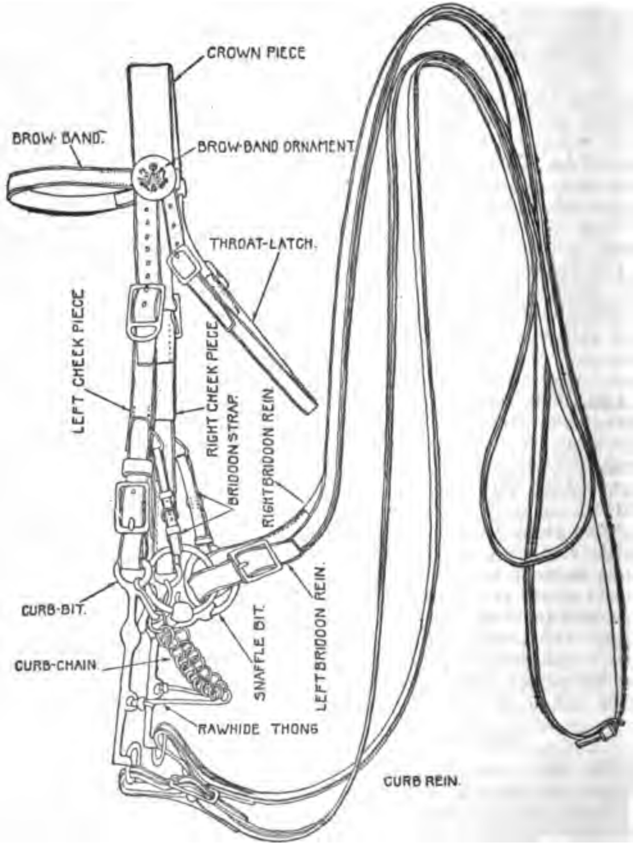


PLATE 2.—THE DOUBLE BRIDLE.

the left, the forefinger against the mouthpiece; bring the crownpiece in front of and slightly below its proper position; insert the left thumb into the left side of the mouth above the tush; press upon the lower jaw, insert both bits by raising the crownpiece, then with the left hand draw the ears gently under the crownpiece, beginning with the left ear; arrange the forelock, secure the throat latch and the curb chain, taking care to adjust them properly.

The bridle with snaffle bit only is put on in a similar manner.

A bridle with curb bit only is not permitted to be used on the horses of individually mounted men. The curb when used alone is a powerful instrument requiring such dexterity in its use that only an expert horseman on a perfectly trained horse is capable of using it with sufficient delicacy and discretion to obtain perfect control without injuring the horse.

A horse quickly resents and is easily frightened by abrupt or sudden movement about his head. Bridling should therefore be done in a most deliberate and careful manner. The ears are especially sensitive, and extreme care must be used in drawing them under the crownpiece and into their place. A reliable test that a horse has not been mistreated in bridling is that he permits, without sign of fear or resentment, the gentle stroking of his ears.

174. Except in the field, or when equipped for field service, or when the duty is such as to make it necessary to tie up a horse, the halter is taken off before bridling, the reins being first passed over the neck.

If the halter is not taken off, the halter strap is tied in the left pommel ring, or, if the horse be not saddled, around his neck. When the halter is to remain on, care should be taken that the halter rope is untied from the manger before attempting to bridle a horse that is liable to pull back.

TO FIT THE SNAFFLE BRIDLE.

175. (*a*) The cheek straps are adjusted so that they are of even length and so that the snaffle rests easily in, but does not draw up the corners of the mouth. A mouthpiece that is too low strikes the tushes and makes them sore; one that is too high causes the horse discomfort and makes the corners of his mouth sore.

(*b*) The brow band is examined. If it is too short, it causes the sensitive skin at the base and back of the ears to be galled or cut by the crownpiece. If it is too high on the crownpiece, it causes the same trouble at the base and sides of the ears.

(*c*) The throatlatch is buckled loosely, being only sufficiently tight to prevent the crownpiece from slipping over the horse's ears. Generally speaking, it should permit the entire flat of the hand to be inserted between it and the throat when the horse's head is reined in. A tight throatlatch interferes with the large blood vessels of the neck, with the gullet, and also with the windpipe.

(*d*) The mane and forelock are carefully smoothed out under the crownpiece to avoid causing a sore at the poll and also to present a neat and tidy appearance.

TO FIT THE DOUBLE BRIDLE.

176. (*a*) The snaffle is fitted as described in the preceding paragraph.

(*b*) A curb bit is selected with a mouthpiece of such length that the branches bear easily against the horse's lips. A narrow bit pinches the lips, while a wide one works about and bruises the lips and the bars. The mouthpiece is best examined for width by inspecting it from the underside of the lower jaw.

(*c*) The cheek straps are adjusted so that the mouthpiece of the bit rests as near as possible opposite the chin groove, but touching neither the tushes nor the corners of the mouth. Generally speaking, the bit should rest about 1 inch above the tushes of horses and about 2 inches above the corner teeth of mares. It rides below the snaffle.

(*d*) The curb chain is fastened outside and below the snaffle. It must be twisted to the right until it lies flat, and it should rest in the chin groove opposite the mouthpiece of the bit. If not properly adjusted it will have a tendency to ride up and press upon the sharp bones of the lower jaw. The curb chain should be loose enough to admit the flat of two fingers between it and the chin groove when the branches of the bit are in line with the cheek straps. When brought to bear the branches of the curb bit should make an angle of about 45° with the line of the horse's mouth.

When horses are restive it is often due to faulty adjustment of the bits and curb chain.

(*e*) The throatlatch and brow band are fitted as directed in paragraph **175.**

TO REMOVE THE DOUBLE BRIDLE.

177. The instructor commands: **UNBRIDLE.**

Stand on the left side of the horse; pass the reins over the horse's head, placing them on the bend of the left arm; unbuckle the throatlatch, grasp the crownpiece with the right and assisting with the left hand gently disengage the ears; grasp the bit with the left hand, and gently disengage it from the horse's mouth by lowering the crownpiece; place the crownpiece in the palm of the left hand, take the reins in the right hand, pass them together over the crownpiece, make two or three turns around the bridle, then pass the bight between the brow band and crownpiece and draw it snug.

The bridle is hung up by the reins, or placed across the saddle on the blanket.

If the horse has no halter, unbridle and push the bridle back so that the crownpiece will rest on the neck behind the poll until the halter is replaced.

TO ROLL THE OVERCOAT.

178. Spread the overcoat on the ground, inside down, skirt buttoned throughout, sleeves parallel to the middle seam, collar turned over on the shoulders.

Turn the tails of the coat under about 9 inches, the folded edge perpendicular to the back seam. Fold over the sides to form a rectangle not more than 34 inches across, according to the size of the coat. Roll tightly from the collar with the hands and knees and bring over the whole roll that part of the skirt which was turned under, thus binding the roll.

THE BLANKET ROLL FOR INDIVIDUALLY MOUNTED MEN.

179. Spread the shelter half on the ground, roll straps underneath, and fold over the triangular part on the rectangular part. Turn under the roll strap edge of the shelter half so that the width of the fold will be 8 inches. Fold the blanket once across the longer edges and lay the blanket on the shelter half, folded edge within 1 inch of the roll strap edge of the shelter half. Fold the sides of the blanket and of the shelter half inward, width of folds about 11 inches. The shelter tent pole and pins are now laid on the blanket at the edge farthest from the roll strap edge, pole on one side of the center line, pins on the other, so as to allow the roll when completed to bend at the center. Place the underclothing on the blanket. If the coat is to go in the roll, spread it smoothly over the blanket.

Roll tightly toward the roll strap edge, using hands and knees, and bring over the entire roll the part of the shelter half which was turned under, thus binding the roll. Buckle the two available roll straps about the roll, passing them around twice. The roll thus formed should be about 44 inches long.

THE BLANKET ROLL FOR MEN NOT INDIVIDUALLY MOUNTED.

180. Lay the shelter half on the ground and fold over the triangular part.

Hold the blanket up by two corners, the shorter edges vertical; bring the two corners together, thus folding the blanket in the middle; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulder, the blanket extending between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand between the thumb and forefinger; slip the second finger of the right hand between the folds, seize the double folded corner; turn the left (disengaged) corner in and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds. The blanket is now folded in six thicknesses.

Lay the folded blanket on the shelter half so that one of its shorter sides will be about 8 inches from the edge of the shelter half farthest from the triangular part. Place the underclothing on the blanket. If the coat is to go in the roll, fold it and place it on the blanket with the folded edge of the sweater even with that of the folded edge of the blanket. Across the other short side of the blanket place the shelter tent pole and pins.

Fold over the sides and ends of the shelter half which lie outside of the blanket, causing the ropes and straps to be included within the folds.

Commencing at the end where the pole and pins are placed roll the pack, using the hands and knees to insure the roll being made as tight as possible. Just before the roll is completed open out slightly with the hands the pocket formed by the 8-inch fold of the shelter half, and then draw the pocket over the roll, thus binding it. Care should be taken to draw the canvas over the ends of the roll so as to prevent rain and dust from entering the inner portion of the roll. The roll thus formed should be about 22 inches long.

TO PACK THE SADDLEBAGS.

181. Saddlebags are packed as follows:

IN RIGHT POCKET.

Inside of lining:
- 1 currycomb.
- 1 horse brush.
- 1 grooming cloth.
- 2 fitted horseshoes (with nails).

Outside of lining, toilet articles:
- 1 cake soap.
- 1 comb.
- 1 toothbrush.
- 1 tooth paste
- 1 towel.

IN LEFT POCKET.

- 1 meat can.
- 1 knife.
- 1 fork.
- 1 spoon.
- 1 cup (if old mod. equipment).
- 1 bacon can.
- 1 condiment can.
- 2 days' reserve rations.

TO PACK THE SADDLE.

182. The overcoat, when carried, is rolled as prescribed and strapped on the pommel.

When the slicker is carried, either with or without the overcoat, it is suspended vertically from the collar, folded two or three times across its short dimension so as to leave the outside of the slicker out, and then thrown across the horse's withers, collar to the left and coat hanging evenly on the two sides. The slicker is then secured in the middle, with center pommel coat strap only.

183. The saddlebags, packed as prescribed, are attached to rear of saddle, by saddlebag stud and staples, and to cincha rings by saddlebag straps.

The blanket roll made as prescribed is strapped to cantle with one short strap and to the saddlebag rings with two long (60-inch) straps; short strap drawn tightly.

The feed bag, folded neatly, with marking displayed, is secured under straps of left saddlebag.

The canteen snapped to right cantle ring.

The lariat, attached to the picket pin by lariat strap, is neatly and tightly wound about the picket pin and secured. The picket pin is then snapped to left cantle ring.

TO STAND TO HEEL.

184. The instructor commands: **STAND TO HEEL**: Each man stands at attention 1 yard in rear of and facing his heel post. At the picket line he is 1 yard in rear of and facing his horse.

TO STAND TO HORSE.

185. The instructor commands: **STAND TO HORSE**: Each man places himself, facing to the front, on the left side of his horse, eyes on a line with the front of the horse's head, so that he can see along the front, and takes the position of attention, except that the right hand, back uppermost, grasps both reins, forefinger between them, about 6 inches from the bit. The reins are on the horse's neck.

TO LEAD OUT.

186. The men standing to horse, to leave the stable or picket line, the instructor commands: **LEAD OUT.**

Each man, holding his hand well up and firm, leads his horse, without looking at him, to the place designated by the instructor.

The men form in single rank from right to left, and, until further orders, with intervals of 3 yards.

If the horse shows a disposition to resist being led, the man takes the reins from the horse's neck, takes the ends in the left hand, then, with the right hand holding the reins, leads the horse as before. When leading through a low or narrow doorway the horse should be quieted by the voice or caresses, and not allowed to pass through hurriedly. To prevent the horse from rushing ahead the instructor may direct the man to face toward the horse, holding one rein in each hand, close to the bit, and lead him by stepping backward; after passing the doorway the man leads the horse as before.

ALIGNMENTS.

187. The men being in line at a halt at stand to horse, the instructor sees that the men on the flank toward which the alignment is to be made are in the desired position and commands: 1. **Right (Left)**, 2. **DRESS**. 3. **FRONT**. Executed as in The Soldier Dismounted, except that the left hand is not placed on the hip, and each man moves his horse forward or backward, as may be necessary, to align him. The instructor may place himself on either flank and give a general alignment by ordering individual men to move their horses backward or forward.

TO MOUNT (WITHOUT SADDLE).

188. 1. Prepare to mount, 2. MOUNT.

At the first command drop the right rein, take two back steps, stepping off with the left foot, at the same time sliding the right hand along the left rein face to the right. This should place the man behind the left shoulder of the horse. Take both reins in the right hand, aided by the left, the reins coming in on the side of the forefinger, forefinger between the reins, the loose end falling over on the off side; place the right hand behind the withers, holding the reins short enough to feel lightly the horse's mouth; place the left hand near the withers, and grasp a lock of the mane, the lock coming out between the thumb and forefinger.

At the command **mount**, spring lightly from the ground and raise the body, keeping it erect, and supporting the weight on the hands; carry the right leg, knee bent, over the horse's back, the weight still borne on the hands; sit down gently on the horse's back, and take one rein in each hand, the reins bearing equally on the horse's mouth.

POSITION OF THE SOLDIER, MOUNTED (WITHOUT SADDLE).

189. Body balanced on the middle of the horse's back. Head erect and square to the front.

Chin slightly drawn in, but not so much as to produce stiffness.

Body erect, but without stiffness.

Forearms close to the sides, without pressure.

Hands about 6 inches apart, backs straight up and down and outward and held low, so that the little fingers will brush the mane on top of the withers.

The right rein in the right hand and the left rein in the left hand, coming in on the underside of the little finger and coming out over second joint of forefinger, on which the thumb firmly holds the rein; the other fingers closed on the reins, nails toward the body; reins bearing equally on the horse's mouth; bight (end) of reins falling to the front and on the right side of the horse's neck.

Buttocks bearing equally on the middle of the horse's back, the seat being as flat as possible.

Legs stretched by their weight alone; the horse clasped by the entire leg—that is, the flat of the thighs, the inside of the knees, and the calf of the leg.

Feet hanging naturally and turned out at whatever angle the conformation of the man requires in order to grasp the horse as above.

REMARKS ON THE POSITION OF THE SOLDIER MOUNTED.

190. Body erect but without stiffness.—While the head and shoulders should not droop forward, nor the chest be contracted, nor the back curved to the rear, and any tendency to slouch should be promptly corrected, still no part of the body should be held so straight or erect as to produce stiffness.

Forearms close to the sides without pressure, to prevent their being thrown out when the horse trots; if with pressure, the motion of the body will be communicated to the hand and rein.

Buttocks bearing equally, and seat as flat as possible, so that the body will preserve its steadiness.

Flat of thighs, inside of knees, and the calf of the leg clasping the horse equally to give a firm, steady seat.

The body from the hips up should be movable and should yield to the motion of the horse.

The man should have hold the horse all the time with the legs, but not grasping him so much as to produce fatigue; his legs from the inside of the thighs and knees and calf should be in constant contact with the horse, but not so much so as to produce fatigue in the man. The arms should be without stiffness at the shoulders to avoid communicating the motion of the body to the reins.

The hands take a gentle feel of the horse's mouth, but otherwise are stationary, except to direct the horse.

During the early lessons the position of the soldier is necessarily one of constraint. He will probably be much fatigued and possibly made sore in tendons and muscles. An effort should be made to teach him to ride without unnecessary fatigue or injuring him physically and without putting him to anything which will tend to destroy his confidence on a horse or his "nerve."

No man can be said to be a good horseman who has not a firm, well-balanced seat and good hands; these are therefore of the utmost importance; they will assist the horse; the want of them will impede the horse's actions and make sore backs.

THE RESTS.

191. Being at stand to horse, the commands are: **AT EASE** and **REST**, which are executed as prescribed in The Soldier Dismounted, except that each soldier retains his hold of the reins to keep his horse in place.

Being mounted and at a halt, the commands are: **AT EASE** and **REST**; if marching, **ROUTE ORDER**. At the command at

ease the soldier may turn his head and make slight changes of position, but preserves silence.

At the command **rest** or **route order**, the soldier may turn his head, may talk, and make slight changes of position, but must not lounge on his horse.

To resume the attention: 1. **Squad**, 2. **ATTENTION.** The soldier, if dismounted, takes the position of stand to horse; if mounted, he takes the position of the soldier mounted.

If the squad be mounted, attention may be resumed by the command: 1. **REINS.**

TO DISMOUNT (WITHOUT SADDLE).

192. 1. **Prepare to dismount**, 2. **DISMOUNT.**

At the first command pass the right rein into the left hand, then seize both reins with the right hand, in front of the left, forefinger between the reins, and place the right hand on the withers, the reins coming into the hand on the side of the forefinger; let go with the left hand and grasp a lock of the mane in front of the withers, the lock coming out between the thumb and forefinger.

At the command **DISMOUNT**, raise the body on both hands, carry the right leg, knee bent, over the horse's back without touching it; bring the right leg near the left and come lightly to the ground on the balls of the feet, bending the knees a little; face to the left, drop the right rein, step to the front, sliding the right hand along the left rein, and take the position of stand to horse.

TO LENGTHEN OR SHORTEN THE REINS.

193. Bring the hands toward each other; grasp the right rein with the thumb and forefinger of the left hand a short distance from the right thumb; relax the grasp of the right hand and allow the rein to slip through to get the proper bearing; then close the right hand and replace the hands. With the left rein the positions of the hands are reversed.

TO TAKE THE REINS IN ONE HAND.

194. To relieve the constraint of the arms by changing their position, as well as to prepare the men for the use of the curb bridle, the instructor commands: 1. **In left (right) hand,** 2. **TAKE REINS.**

At the second command bring the left hand opposite the middle of the body; half open and place in it the right rein, holding both reins as explained for the left rein, except that the little finger separates the reins, the right rein coming in about the little finger; close the left hand and drop the right hand behind the thigh.

TO ADJUST THE REINS.

195. Seize the bight with the thumb and forefinger of the right hand: partly open the left hand so as to allow the reins to slip through it; raise the right hand until the reins bear equally; close the left hand upon them. letting the bight fall over the forefinger and right rein; drop the right hand.

TO RETAKE THE REINS IN BOTH HANDS.

196. The reins being in the left hand: 1. **In both hands,** 2. **TAKE REINS.**

Half open the left hand, seize with the right hand the right rein, and hold them as previously described.

TO DROP AND RETAKE REINS.

197. Drop reins: Drop the reins on the horse's neck near the withers and drop the hands behind the thighs.

Take reins: The man retakes the reins and holds them as before dropping them.

TO MOUNT FROM THE RIGHT SIDE.

198. Executed as in mounting from the left side, but by inverse means.

199. If the command be **mount** the men execute all that has been prescribed for **prepare to mount** and **mount.**

TO DISMOUNT ON THE RIGHT SIDE.

200. 1. **To the right.** 2. **Prepare to dismount.** 3. **DISMOUNT.** Executed as in dismounting from the left side, but by inverse means.

201. The men are frequently practiced in mounting and dismounting on the right side.

202. If the command be **DISMOUNT**, the men execute all that has been prescribed for **prepare to dismount** and **DISMOUNT.**

TO DISMISS THE SQUAD.

203. The squad being in line at stand to horse: 1. **By the right (left, or right and left)**, 2. **FALL OUT.**

The man on the right leads his horse 1 yard to the front and then directly to the stable or picket line. Each of the other men executes in succession the same movement so as to follow the horse next on the right at a distance of 1 yard.

Being in column of files or twos, at the command **FALL OUT,** the leading rider or the rider on the right of each two leads out as prescribed and is followed by the other riders in turn.

The men remove, clean, and put the equipments in place, and care for and secure their horses under the direction of the instructor.

The instructor, having satisfied himself by inspection that the horses and equipments are properly cared for, and that the precautions required for the care of horses on their return from exercise have been observed, orders that the men be fallen in, marched to the company parade, and dismissed.

SECTION III.—ELEMENTARY TRAINING IN EQUITATION AND HORSEMANSHIP.

ESTABLISHING CONFIDENCE.

204. The first object to be attained in elementary instruction in equitation is to establish the confidence of the rider. Many recruits, especially those who have never before had any experience with horses, entertain an instinctive and unreasoning timidity which can be overcome only by slow, careful, and quiet instruction involving judgment and tact on the part of the instructor.

Only quiet, gentle, and well-trained horses are used in the instruction of recruits. Effort must be made to avoid falls or other accidents which might spoil the beginner's nerve and so retard his progress.

With this object in view the beginner is permitted to use the same horse for the first few mounted lessons. When it is seen that he is beginning to understand his mount, horses and riders are changed, usually with each lesson, and the training of a soldier should be considered incomplete and unsatisfactory until the average animal goes quietly and pleasantly with him at any gait.

For the first few lessons, both as a measure of security and to avoid weariness, stirrups should be used. In some cases greater security is also afforded if the stirrups are connected by a strap passing under the horse's belly and of such length that the man's knees are not drawn away from the saddle. The strap saves falls because it prevents the rider's legs from flying out far in any direction and the confidence it instills enables him to acquire balance more quickly.

Later lessons, both for the purpose of acquiring confidence and learning balance, must include riding without stirrups. Confidence is also imparted through riding without reins. This is one of the best ways for a beginner to acquire a good strong seat which is independent of the reins. Fixity of the seat helps to produce good hands.

The early mounted lessons are conducted at a walk. The trot and then later the gallop are taken up as soon as practicable, but not until the instructor judges that the confidence acquired justifies proceeding to the faster gaits.

SUPPLING EXERCISES.

205. Suppling exercises play an important part in the instruction of the rider, but their use demands tact. Used by some instructors without order or method, or for too prolonged a period, they give only mediocre results; by others, however, they very quickly improve even the least gifted riders.

The exercises are performed in the saddle usually with stirrups crossed or detached; always with snaffle bridle and never with spurs. The reins are held or not, at the discretion and direction of the instructor. When the exercises are suitable, and when they are being executed without reins, the instructor causes the rider to hold one or both hands as though they were actually riding with the reins.

The reins when held should neither flop nor be too tight. In a word, the instructor should seek to teach his pupils just to feel the horse's mouth, while leaving the horse the free use of his neck by following its movements with the hands. This feeling, in developing little by little, will serve to establish the principle of gentle contact of the hand with the horse's mouth. It must be constantly spoken of and sought from the beginning. In a short time the man follows instinctively the movements of the head and neck.

Constant effort should be made to overcome stiffness of the arms and shoulders, which is frequently the cause of a heavy hand.

The instructor is especially careful that the movement of one part of the body does not react on any other part; for example, that an exercise of the right arm does not disturb the left arm or the position of the loins or legs.

206. The exercises herein indicated are recommended as the most useful, but they are not the only ones.

Instructors may add others for the purpose of varying the work and adding to its interest.

Any movement is proper which engages the rider's attention and leads him to forget that he is on horseback and thereby brings about relaxation.

The end desired is attained by the frequency and variety of the exercises; the instructor must carefully avoid prolonging a movement to weariness, which inevitably brings on rigidity.

These exercises, if understood and intelligently applied, are extremely beneficial in:

(*a*) Strengthening the muscles used in riding.

(*b*) Assuring the correct seat.

(*c*) Giving the soldier balance and inspiring him with confidence in his ability to maintain his seat, while inducing general suppleness and relaxation of the body.

(*d*) Accustoming him to keep the thighs constantly pressed against the horse.

(*e*) Leading him to acquire independence in the use of the aids.

The exercises are first given at the halt, then, except as indicated and as confidence is established, they are progressively taken up at the walk, trot, and gallop.

To put the squad in march the instructor designates a man, preferably an enlisted assistant, who is a noncommissioned officer or an instructed private and who is mounted on a steady-gaited horse, to act as leader, and causes him to take the track; he then causes the other men to take their places in column of files behind the leader. The riders are restricted to letting their horses follow those in front.

At first the pace of the trot should be moderate. It may be increased to normal when the riders have acquired sufficient steadiness of seat to maintain a correct position at that gait.

As soon as the riders have acquired a fair security of seat at the trot and have grown accustomed to a fast gait, the instructor begins to train them at the gallop. The first lessons are given on a large circle, so that the horse will have less tendency to pull. The men retain their reins and stirrups until they have gained confidence.

The gallop should be employed very early in the instruction, as it is the most favorable gait for suppling the loins.

Every effort should be made to maintain good humor; it is the best aid to suppling. Instructors and pupils must ever bear in mind that the greatest obstacle to good horsemanship is **bad temper** in either rider or mount.

In those mounted suppling exercises the purpose of which is to push the buttocks to the front, to spread the thighs at the hips, or to lower the position of the thighs and knees the best results are always obtained by slightly elevating the toes and depressing the heels during the exercise. On completion of the movement the rider then permits the toes to fall and the leg and foot to hang naturally.

To execute the exercises a movement is announced and the command **EXERCISE** is given. The movement is then continued and repeated until the command **HALT.** The reins when held are shifted as necessary, without command.

207. Flexion of the loins: At the command **BEND TO THE RIGHT AND LEFT,** the soldier without deranging the position of the hands or of the part of the body below the waist, slowly inclines the upper part of the body to the right; then, returning slowly through the initial position, makes a corresponding movement to the left.

At the command **STROKE YOUR HORSE ON THE RIGHT FLANK**, sit down in the saddle by pushing the buttocks forward, turn the body at the hips without deranging the position of the legs and, leaning backward but not to the side, place the right hand as low as possible on the horse's flank.

208. Rotation of the loins: At the command **STROKE YOUR HORSE ON THE LEFT HAUNCH WITH THE RIGHT HAND,** turn in the saddle without deranging the seat or the position of the thighs and stroke the horse on the left haunch with the right hand, taking care to avoid opening out the left elbow or pulling on the reins.

209. Rotation of the arm: At the command **ROTATE THE RIGHT ARM VERTICALLY**, extend the arm upward, palm to the front; then drop the arm to the rear and describe slowly and with uniform movement a vertical circle, keeping the head erect and high while the arm is descending.

210. Rotation of the thigh: At the command **ROTATE THE RIGHT THIGH**, remove the knee from the saddle and carry it back, straightening the leg; turn the knee in as much as possible and then, replacing the thigh flat upon the saddle, draw it forward to its normal position with much friction in order to press the thick muscles to the rear and to permit the femur to rest solidly against the saddle.

211. Raising the thighs: At the command **RAISE THIGHS,** raise the knees only so much as is necessary to detach the thighs and lower legs from the saddle, and incline the upper part of the body slightly backward. If the soldier is sitting too far back in the saddle, the instructor directs him to draw himself forward by grasping the pommel.

This position compels the soldier to supple his body in order to keep his seat.

When his equilibrium is well established the rider gently replaces his thighs upon the saddle, being careful to keep his loins in the same position as during the movement.

This exercise fixes the loins in place and puts them in proper position to maintain the balanced seat. It is executed only at a walk, slow trot, or canter.

212. Flexion of the leg: At the command **FLEX THE RIGHT LEG**, bend the leg slowly without deranging the position of the knee or that of the body.

213. Flexion of the ankle: At the command **CIRCLE THE RIGHT FOOT**, trace with the toe of the designated foot, by a slow and uniform movement, a vertical circle from outward inwardly, and from below upward, without disturbing the position of the leg. The circle with the right foot is made clockwise, with the left foot contraclockwise.

MOUNTED GYMNASTICS.

214. Mounted gymnastics comprise exercises that, if properly conducted and not pushed beyond the capabilities of the average man, are valuable for suppling the rider and imparting confidence. Those exercises that may occasion hard falls or those that a few men can do and others can not do are destructive of confidence and harmful to progress in equitation, since the soldier who can not do them is prone to think that he is too poor a gymnast to be a good rider. The exercises, then, should be such that every man, with a little practice, can perform them with a fair degree of proficiency.

Mounted gymnastics in themselves are not an object of instruction. They are but a means to an end and must be so considered.

The exercises outlined below are good, though not the only ones that the instructor may employ. They are divided into two groups, those with the horse in place and those with the horse in motion. The men are in shirts and gymnasium shoes and without hats.

Exercises with the Horse in Place.

215. These exercises may be performed on any gentle horse. The reins are knotted and placed on the neck. In some cases it may be necessary for an assistant to stand at the horse's head. The animal may be bareback or saddled with stirrups detached.

1. Mount and dismount, or inversely.
2. To the right, mount and dismount, or inversely.

3. Being mounted, faced to the front, place the hands on the pommel or the withers; then rise on the hands and extend the legs to the rear until about 1 foot above and parallel to the horse's back, then immediately snap them forward, keeping them close to the horse's sides and regain the natural seat. This exercise is very good for obtaining a deep position of the knees.

4. Being mounted, faced to the front, extend legs to the rear, cross them, and regain seat faced to the rear. This is called the shears.

5. Being mounted, faced to the rear, place hands on pommel or withers, extend the legs, execute the shears over the croup, and face to the front.

6. Being mounted, faced to the front, lean forward and place the right or left shoulder on the withers, extend the legs upward, and stand on the shoulder. From this position spring to the ground or regain the natural seat.

7. Being mounted, faced front or rear, swing one leg over neck or croup and take the side mount. In the side mount the position of the body and legs is approximately that which is assumed in a side saddle.

8. Being mounted, faced to the rear, place hands on croup and leap to the ground behind the horse.

9. Being mounted, faced to the front, squat on both feet. From this squatting position stand up, then pressing feet and legs hard against the horse's sides slide slowly down into the seat. This exercise is good for strengthening the thighs.

10. Being in rear of the horse, take a short run, place hands on croup, and leap into seat faced to the front.

11. Same, doing shears while executing the leap, and land on the horse's back, faced to the rear.

12. Being mounted, faced to the front, bend to the front and downward and while one hand holds a lock of mane, reach with the other as near to the ground as possible, keeping the legs and buttocks approximately in place.

Exercises with the Horse in Motion.

216. These exercises are best performed with a specially selected and trained horse on the longe on a large circle. The horse is preferably rigged with an improvised leather girth, held in place by a standing martingale and having a leather handle on each side of and about 6 inches below the line of the back. To prevent the girth from turning it must have a pommel arch. In order to make the animal go steadily and smoothly the side reins should be fastened to the girth.

The gait used should be a very slow, steady gallop. For a section of 16 men two horses should be kept going at a time, and, as the work is very hard on them, they should be changed for others at the end of 15 minutes. For 16 men one-half hour of any one lesson period is sufficient time to devote to this instruction.

1. Being mounted, execute any of the suppling exercises.
2. Dismount and mount faced to the front.
3. Being mounted, extend the legs to the rear.
4. Being mounted, faced to the front or rear, throw leg over neck or croup, and take the side mount.
5. Being mounted, execute any of the suppling exercises while the horse goes over a 1½ to 2 foot jump.
6. Being mounted double, man in rear dismounts and mounts.
7. Being mounted double, man in rear dismounts and mounts standing.
8. Dismount and mount faced to the rear.
9. From the side mount facing to the front, dismount and mount facing to the front or rear.
10. Being mounted, place outside foot through outside handle, grasp inside handle with outside hand, and reach for some object on the ground.

217. The rider when dismounting, vaulting, or leaping grasps a lock of mane in front of the withers with the hand on the side toward which he intends to dismount, and grasps the handle on the same side with the other hand. During the exercises, when dismounted, he keeps pace with the horse at the latter's shoulder by means of the galloping step, which he executes, keeping his hands in place, by a succession of leaps, rising and alighting with the rise and fall of the forehand of the horse, keeping the left or right foot in advance according as he is on the left or right side of the horse and supporting the weight on the balls of the feet.

To secure a proper leap for vaulting back onto the horse the rider, whether he leaps from the galloping step or from his landing place, plants his feet squarely together, facing the front, and makes the leap from both feet.

A proper leap can not be made if the elbow nearest to the horse is carried up on the animal's back. This elbow must be down along the horse's side, as otherwise the man is too close to and jumps against his horse in trying to make the vault.

When mounting double, with the horse in motion, the man on the ground grasps the rider's belt with the hand nearest the horse and the rider's elbow with the other. The rider takes care to assist in the leap by pulling strongly against the dismounted man as the latter springs from the ground.

GAITS OF HORSES.

218. The gaits are the walk, trot, canter, and gallop.

The **walk** is at the rate of 4 miles an hour, or 1 mile in 15 minutes, or 117⅓ yards in a minute.

The **maneuvering trot** is at the rate of 8 miles an hour, or 1 mile in 7½ minutes, or 234⅔ yards a minute. For purposes of individual instruction, the rate of the trot may be diminished to the rate of 6 or 6½ miles an hour by the command **SLOW TROT.** At the command **trot out**, the rate is 8 miles an hour.

The **canter** is at the rate of 8 miles an hour and is generally used for individual instruction.

The **maneuvering gallop** is at the rate of 12 miles an hour, or 1 mile in 5 minutes, or 352 yards a minute.

The length of the stride is about 10 feet.

The full or **extended** gallop is at the rate of 16 miles an hour.

To instruct in the maneuvering cadences, stakes are placed on the drill ground, on a convenient line for a long track, 117⅓ yards apart. The men and guides are required to march over the spaces at the rate of one, two, three, or four per minute, according as the gait is the walk, trot, canter, gallop, or full gallop.

Instruction in each gait should be practiced individually and collectively until each man knows whether he has the proper speed or cadence by the rhythm of motion.

Horses may be trained to walk in column under favorable conditions 4½ miles an hour, making 125 steps a minute, the stride being 0.916 yard.

The average walk of a horse is a mile in 16 minutes, 3.75 miles an hour, making 120 steps (110 yards) per minute, the stride being 0.916 yard.

The average trot of a horse is a mile in 8 minutes, 7.5 miles an hour, making 180 steps (220 yards) per minute, the stride being 1.22 yards.

ANALYSIS OF GAITS.

The Walk.

219. The walk is a gait in which the feet are lifted in succession and put down in the order of their lifting. If the right front foot begins the gait, the other feet are lifted in the following order: Left hind, left front, right hind. The walk should be free, easy, and elastic.

The Trot.

220. The trot is a gait at which the horse springs from one diagonally disposed pair of feet to the other; between the beats all the feet are in the air. The right front and the left hind are called the **right diagonal**, the left front and the right hind the **left diagonal**.

The Gallop.

221. The gallop is the most rapid of gaits. It must not be used unnecessarily over long distances, particularly on hard roads, where the concussion on the feet is severe, nor when the saddle is packed. However, when the rapidity of the normal trot is not sufficient, the rider, when out alone, should take the gallop in preference to increasing the speed of the trot.

The horse is said to **lead right** when the feet on the right side are more advanced than the corresponding feet on the left side. When the feet are advanced in the inverse order the horse is said to **lead left**.

The gallop is marked by three beats and a period of suspension. If the horse be leading right, the first beat is marked by the left hind foot, the second by the nearly simultaneous placing of the right hind and left front feet, and the third by the placing of the right front foot. The horse then leaps into the air from, and advances, the right front foot. In leading left the beats are right hind, left hind, and right front, left front.

A horse gallops **true** when he leads right in turning to the right, and leads left in turning to the left.

He gallops **false** when he leads left in turning to the right, or conversely. A horse is **united** when he gallops right (left) in front and right (left) behind. He is **disunited** when he gallops right in front and left behind, or conversely.

The gallop should be begun on the circle, because the feet are then favorably placed for taking and maintaining the proper lead. The horses thus start off more calmly and the rider is enabled to regulate the pace by describing a circle of greater or less circumference.

As soon as the horse breaks into the gallop the rider should move in cadence with his horse. The back and legs unite in the rhythm of the gait, the hands accompany gently and **without exaggeration** the movements of the head and neck.

During the gallop the command **at ease** is frequently given. The riders execute the suppling exercises which have been indicated as necessary in each case; they abandon themselves completely to the motion of the horse and thus acquire ease and flexibility. Prolonged periods at the gallop on calm and free-moving horses are most favorable for easily obtaining this result.

The canter is the collected or school gallop.

THE AIDS IN HORSEMANSHIP.

222. A horse is **bit-wise** when (the bit being correctly fitted and properly adjusted) he obeys the lightest pressure upon either bar.

He is **rein-wise** when he obeys the lightest pressure of the rein on either side of the neck, the bit not being disturbed from its normal position.

He is **leg-wise** when he obeys the lightest correctly combined action of the rider's legs.

223. The means at the disposal of the rider for controlling the movements and gaits of his horse are his **legs, reins,** and **weight.** These are termed **the aids.** On suitable occasions the leg aids are assisted or emphasized by a proper use of the **spurs.** According to their very nature, the legs are the driving while the reins are the restraining aids. Both are effectively assisted by the weight of the rider. Of the two aids, the driving and the restraining, the former are overwhelmingly predominating. As the training of a horse or rider progresses, the aids must become more refined and less noticeable until the horse, without perceptible effort on the part of the rider, seems to obey the latter's thoughts alone.

Leg Aids.

224. The legs should be free from all involuntary movement and very steady in their action. A swinging leg confuses the horse. The legs act by the pressure of the calves with heels well shoved down. They are applied gradually, according to the sensibility of the horse, so that the latter will not be surprised and give a sudden start. If pressure alone is insufficient the rider increases the action by taps with the calves, increasing in severity until obedience is obtained, when the action should cease.

The position of the lower leg determines the nature of its effect. Thus, if both legs are applied near the rear edge of the girth the effect should be to drive the horse forward or to increase his gait, while if one leg is drawn and applied a little farther to the rear its effect, according to the intensity of its action, should be either to induce or to oppose a lateral displacement of the haunches. When the leg is thus drawn to the rear its position and action are referred to as either **sideward driving** or **supporting.**

Rein Aids.

225. The reins serve to prepare the horse to move, to permit an extension of his gait, to reduce his gait, or to change direction. For effects to be exact the reins must maintain **contact**—that is, a soft elastic bearing of the bit on the bars of the mouth. A man who rides with this soft elastic bearing—that is, with contact—is said to have a **light hand.** It is obtained by maintaining a smooth and steady seat, by keeping the muscles of the shoulders and arms relaxed, and by keeping those of the fingers and wrists soft and springlike in their action. The hands should be perfectly steady, to insure which there should be no motion of the shoulders or elbows.

A few men in seeking light hands ride with loose reins. This is **no hand,** and should be avoided because the rider, having lost communication with the horse's mouth, does not have his mount under instant or prompt control. With the reins loose and flapping the indications of the hand will not reach the horse, or if they do they will arrive confused or in the form of brutal and awkward jerks.

A **heavy hand** is one which maintains such strong and constant pressure on the horse's mouth as soon to deaden it and destroy its sensibility. A heavy hand soon gives a horse a **hard mouth.**

In producing these various effects the reins act by a tension or a yielding. With a well-trained horse a sufficient increase of tension can usually be produced by a mere closing of the fingers and by an inward bending of the wrist. In doing this the middle joints of the fingers approach the body and the little finger moves upward. When a stronger effect is necessary the arm must take part in the movement. The increased action of the reins must cease as soon as the horse obeys the indication.

The rein is yielded when the little finger approaches the horse's mouth while the hand maintains contact. It is yielded in all those cases where it is desired to give the horse the freedom necessary to permit him to move out or to increase his gait. If it is intended to let the horse have sufficient freedom to extend his neck, the whole arm should take part in the movement or the reins should be permitted to slide through the fingers.

The full effect of the rein aids can be produced only when the two reins act reciprocally. A horse will obey the rein on one side by merely bending and turning the head and neck around to that side. This, then, becomes the **inner or direct rein.** In order to execute a turn properly, as well as to limit the bend of the head and neck, the counter action of the other rein is necessary; it then is termed the outer or supporting rein. Its action is usually a slight restraint of the hand, but may, under circumstances, increase to an active resistance or reining in. Either rein may be opened out away from the neck or closed in and bearing against it.

To execute a turn when riding with the reins in two hands, the inner hand is turned upward toward the body of the rider, the little finger rising toward the inner breast; this shortening of the inner rein will cause the horse to bend and go into the turn. The execution is faulty if the rider pulls the head and neck around until they are off the curve of the turn. This is a fault most easily acquired and most difficult to correct. The outer hand yields just sufficiently to permit the horse to obey the shortening of the inner rein, and determines and regulates the radius of the turn by the outer supporting rein bearing against the neck of the horse. Each hand should remain on its proper side; carrying the hands laterally across the withers is faulty.

With the reins in one hand the turn is similarly executed, except that the outer rein predominates in its bearing action against the neck. Here the inner rein is shortened by turning the little finger toward or away from the body or by adjusting the reins before the turn was executed. The action of the hand is faulty if it crosses the withers.

All action of the reins should diminish in intensity when obedience begins, and cease entirely as soon as the desired result is secured.

For equitation work riders can not be too strong in their legs, and very few of them are sufficiently soft and elastic in the use of their hands. *Most of the trouble a rider has in handling his horse can be traced directly to too little use of the legs and too much use of the hands.*

During elementary instruction in equitation the reins should be habitually carried in both hands, as this obtains quicker results in the matter of hands and in the manageability of the horses. However, to prepare the rider for his work in driving, riding with the reins in one hand must not be neglected.

The Weight.

226. The weight of the rider when properly used in connection with the reins and the legs is a very important aid, which, moreover, is entirely independent of the sensibility of the horse's mouth and sides. Its use enables the horse to understand more intelligently and more easily to obey the leg and rein aids.

The use of the rider's weight as an aid will work to the best advantage if the horse's and the rider's centers of gravity were previously in the same vertical line. The knack of going with the horse lies in the ability of the rider to harmonize his center of gravity with that of his horse. The rider who is properly going with his horse should feel as if he and his horse were one in all movements. It is also the easiest way for a horse to carry a rider's weight. On the other hand, a rider who does not possess this knack of going with his horse, by a faulty placing of his weight, will disturb both the gait and the carriage of his horse.

With a correctly gainted horse, the centers of gravity of horse and rider will both fall in the same vertical line if the latter maintains a correct seat and carries his upper body erect. Every deviation from this direction denotes a weight aid.

The rider must then be warned not to hinder the movements of the horse by a bad division of his weight, but, on the contrary, to favor them by acting always in the direction sought.

In moving, stopping, turning, and on two tracks, the rider, by carrying his weight on the buttocks or thighs in the direction of movement may facilitate and hasten the obedience of the horse. These displacements of the weight are quite emphasized in the early handling of the young horse. But they become more and more discreet as his training is perfected.

The Spurs.

227. The spurs are used with horses that are sluggish in obeying the leg aids, as a summons to greater efforts or as a means of punishment.

If used to assist the leg aid the spur should be applied more or less delicately, according to the sensibility of the horse, but not until the leg aid has already been applied. The position of the lower leg must not be disturbed thereby. The rider should avoid digging into the horse's sides. To urge a horse to make greater use of his strength, or as a means of punishment, one or more raps with the spur are administered in the same place, the point of application being immediately in rear of the girth.

If, on very rare occasions, it becomes necessary to administer punishment, the rider before doing so must make sure in his mind that there is actual disobedience, that his demands have not been too great, and that he has not given confusing, contradicting, or incorrect indications. Punishment should never be administered in the heat of anger. Such a state of mind disturbs the understanding between rider and horse and undermines the confidence which the horse should have in his rider.

An independent seat and equestrian tact are absolutely necessary in using the spurs to reinforce the leg aids.

The rider should not be permitted to ride with spurs until he has acquired a proper seat and balance and until he has learned to apply the aids correctly.

THE USE AND ACCORD OF THE AIDS.

228. The beginner must not only learn how and when to apply a given aid, but he must also be made to understand why it should be applied.

229. The training of the new horse involves the infliction of more or less pain, the necessity for which becomes less as his intelligence is quickened into understanding the lightest pressure.

To obtain successful results it is essential that the aids be applied at the right moment; also that they be applied correctly, as follows: First, their application must be intermittent; that is, when an aid is employed to effect a movement the action must be relaxed as a reward for obedience the moment the horse yields in the slightest. The aid should be reapplied and released and reapplied and released until the horse has yielded and completed the movement desired. In other words, when the desired effect has been gained the application of the particular aid which has been used must cease lest the horse becomes insensible to its action. The continual pressure of the legs, for example, would soon make the animal so insensible to leg pressure that he would notice it no more than he does the pressure of the girth.

Second, the aids must be used in the proper relationship; that is, they must mutually assist, not oppose, each other in their action. This is a very common fault, as, for example, demanding one thing with the legs and contradicting it with the hands, or applying one leg to swing the haunches and unconsciously contradicting the desired movement with the other leg. To combat this fault is one of the objects of the suppling exercises.

Third, the aids should be used gently, commencing with the mildest and gradually increasing to a more pronounced form of severity. An aid applied so suddenly or so severely as to make the horse give a sudden jerk, jump, or start is an aid very faultily applied. Such an application of the aids tends to spoil the responsiveness of the horse and ruin his confidence in the rider.

A horse can be properly controlled only by the accord of the different leg, rein, and weight aids. Success depends not upon the strength used, but in the tactful employment of the aids. The ability to recognize at any moment what aids are necessary and to combine them correctly to produce the desired effect constitutes equestrian tact.

TO MOUNT (WITH SADDLE).

230. 1. **Prepare to mount,** 2. **MOUNT.**

At the first command drop the right rein, take two back steps, stepping off with the left foot, at the same time sliding the right hand along the left rein; half face to the right; this should place the man about opposite the girth; with the aid of the left hand take both reins in the right, forefinger between the reins, and place the right hand on the pommel, the reins coming into the hand on the side of the forefinger, and held so as to feel lightly the horse's mouth, the bight falling on the right side. Place a third of the left foot in the stirrup, with the assistance of the left hand, if necessary; rest upon the ball of the right foot; grasp a lock of the mane with the left hand, the lock coming out between the thumb and forefinger.

At the command **mount**, spring from the right foot, holding firmly to the mane and keeping the right hand on the pommel; pass the right leg, knee bent, over the croup of the horse without touching him; sit down gently in the saddle; let go the mane, insert the right foot in the stirrup, pass the reins into the left hand and adjust them.

POSITION OF THE SOLDIER, MOUNTED (WITH SADDLE).

231. Same as previously explained (par. **189**), with the following exceptions: Buttocks bearing equally and as flat as possible upon the middle of the saddle; reins coming into the left hand on the side of the little finger, and leaving it between thumb and forefinger; little finger between the reins, right rein above it; the other fingers closed, thumb pointing to the right front in the prolongation of the forearm and pressing the reins firmly on second joint of forefinger, the end of the reins falling to the front and outside of the right rein; left forearm close to the body without pressure; the back of the hand nearly vertical; left hand in front of the pommel of the saddle and as close to the top of the horse's withers as possible, without resting upon the pommel; right hand behind the thigh, arm hanging naturally; feet inserted in the stirrups so that the ball of the foot rests on the tread of the stirrup, heel slighly lower than the tread.

STIRRUPS.

232. The stirrups should support the feet and the weight of the legs only and be of such length that when the legs are in proper position, the feet out of the stirrups, the treads will be on a level with the lower part of the inner ankle bone.

The length depends somewhat on the formation of the man; a man with a thick, heavy thigh requires a shorter stirrup than a man with a thin, flat one. For long distances at the gallop and trot a shorter stirrup is required than at a walk.

When riding, the stirrups take up, in a measure, the weight of the body in its descent to the saddle, by yielding of the ankles to prevent shock. This action is an easy, quick stiffening of the muscles, which distributes the downward motion between the feet, thighs, and seat.

If, after the man has exercised a short time at the slow trot, he has a close seat, his leg in proper position, with his heel down, but does not easily keep his stirrup, then the stirrup requires shortening.

THE DOUBLE BRIDLE.

283. The general principles for the use of the reins, already explained for the snaffle bridle, apply to the management of the horse with the double bridle, except that the bridle hand is moved instead of both hands. In all movements of the hand the arm should act freely and without constraint to the body, and as the curb bit is much more severe than the snaffle bit, it must be applied gradually and more gently, particularly in halting and in reining back.

To turn the horse to the right (left): Carry the hand a little forward and to the right (left), so that the left (right) rein bears on his neck.

INSTRUCTION WITH SADDLE, DOUBLE BRIDLE, AND SPURS.

284. The instructor causes recruits at first to use the saddle and snaffle bit in executing movements prescribed and does not give them the curb bit and spurs until they have confidence in their seat and are able to ride fairly well.

As a general rule, soon after commencing the use of the saddle in the riding-hall exercises, about one-half the time of each drill may be without saddles, the saddles being removed and conveniently placed in the hall.

A man who can ride bareback can ride with a saddle.

RIDING WITHOUT REINS AND STIRRUPS.

285. Riding without reins should be begun with the very first mounted lesson, and thereafter throughout the elementary instruction a portion of each lesson should be devoted to it.

The instructor causes the riders to take the track behind a leader, and to drop their reins as soon as their horses are going quietly and smoothly. For the first few lessons the gait is confined to the walk, then as confidence is established it is pushed to the trot and later to the gallop. At each gait stirrups should be retained until the riders have lost all sign of nervousness, when they should be abandoned and the work continued without reins or stirrups.

When riding without reins the instructor causes the men to fold their arms in front of their bodies, or place their hands on the hips, overhead, to the side, to the front, or to hold them as though they were holding the reins, and at the same time he sees that they do not derange their seats. The movement of the arms in this manner assists in bringing about relaxation and in acquiring balance.

When riding without reins for the first few times, it may be found advantageous with some men to have their horses led by an instructed soldier, who, in this case, may be either mounted or dismounted. Another method is to put the horse on the longe for the first few lessons without reins.

TO DISMOUNT (WITH SADDLE).

286. 1. **Prepare to dismount,** 2. **DISMOUNT.**

At the first command seize the reins with the right hand, in front of and near the left, forefinger between the reins, so that they come in on the side of the forefinger; place the right hand on the pommel; let go with the left hand, grasp a lock of the mane, the lock coming out between the thumb and forefinger; take the right foot out of the stirrup; partly disengage the left foot, body erect.

At the command **DISMOUNT**, rise upon the left stirrup, pass the right leg, knee bent, over the croup of the horse without touching him; descend lightly to the ground, remove the left foot from the stirrup and place it by the side of the right, body erect; let go the mane; place the end of the reins on the neck near the pommel of the saddle with the right hand, which then seizes the left rein; face to the left, take two short steps, left foot first, slipping the right hand along the left rein, and take the position of stand to horse.

GATHERING THE HORSE.

287. Before the horse is required to execute any movement he should be given a preparatory signal. This signal should be given at the time of the preparatory command or signal.

Whatever the movement to be executed, the signal is always the same. Its object is to attract his attention and to prepare him for a movement. This is called **gathering the horse.**

Having a light pressure of the bit against the horse's mouth and a light feel of the lower legs against his sides, the rider, in order to gather him, increases the pressure of the lower legs, with heels well shoved down, and slightly increases the tension of the reins. These pressures are increased intermittently until the elastic movement of the horse under the rider indicates that the former has observed the signal.

If, when at a halt, the horse backs, or when marching decreases the gait, the tension applied to the reins has been too great. If, when at a halt, the horse moves forward, or when marching he increases the pace or gait, the impulse given with the legs has not been met or controlled by the reins.

Each force should exactly balance the other, and the horse, held between the two, should feel responsive to the indications and aids of the rider.

TO MOVE FORWARD.

238. Being at a halt: 1. **Forward,** 2. **MARCH.** At the first command the rider gathers the horse; at the second he simultaneously (1) pushes his buttocks to the front, (2) acts with both legs according to the temperament of the horse, (3) eases the reins by slightly relaxing the fingers and giving the wrist, without losing contact. The aids cease to be active as soon as obedience is obtained.

TO HALT.

239. Being at the walk: **HALT.** The rider sits well down in the saddle and gathers the horse; he then simultaneously (1) closes the fingers on the reins, bending the wrist, and, if necessary, moving the hands in and back with the body; (2) slightly increases the pressure of the legs; (3) imposes the weight of his body against the horse's back by convexing his loins backward.

As soon as the horse slackens the gait ever so little the pressure of the fingers and legs is slightly relaxed to reward him for his obedience. It is then reapplied and again relaxed until the horse has completed the movement desired.

In order to prevent the horse from halting entirely on the forelegs, the rider must increase the pressure of his legs to induce the horse to engage his hind legs farther under the mass. By convexing his loins and imposing his weight against the muscular activity of the horse's back, the rider limits the functionizing of the muscles which control impulsion and thus permits the hind legs to participate in stopping or in reducing the gait. It is faulty to lean back in an exaggerated position, because of the tendency to permit the legs and thighs to go forward and to act with a dead pull of the reins on the horse's mouth; if done abruptly, it is painful to a horse and may cause him to halt in a hard and jolty manner.

In reducing the gait a steady pull against the mouth must be particularly avoided.

THE HALF HALT.

240. The **half halt** finds constant application in the training of both horse and rider. It is a brief, energetic action of the hands, which the rider executes with the fingers closed on the reins by twisting the wrist quickly from below upward and from front to rear, without losing contact and without stopping the horse. At the same time the rider momentarily closes his legs and convexes his loins as in the halt. The half halt is used to slow up horses that are too ambitious or to carry to the rear the excess of weight that some badly balanced horses allow to come on the shoulders. It is effected according to need, on one rein, on two together, on the snaffle, or on the curb. The hand should regulate the power of its action by the resistance of weight which it meets.

CHANGES OF GAIT.

241. To pass from the halt or the walk to the trot, canter, or gallop, the means prescribed for passing from the halt to the walk are employed and continued until the desired gait is taken.

To pass from a faster to a slower gait, or to a halt, the means prescribed for passing from the walk to the halt are employed and continued until the desired gait is taken or the horse has stopped.

The commands are: 1. **Trot**, 2. **MARCH**; 1. **Gallop**, 2. **MARCH**; 1. **Canter**, 2. **MARCH**; 1. **Walk**, **MARCH**; and **HALT**.

EXTENDING OR REDUCING SPEED AT VARIOUS GAITS.

242. To extend or reduce the speed at any gait the rider employs the means prescribed for passing from the halt to the walk or from the walk to the halt to the extent necessary to obtain the desired results.

The horse in extending the walk increases the amplitude of the movement of his head and neck to the same degree as he increases the length of his step; he accelerates the movement of the head as he increases the cadence or tempo of his step.

The rider aids these movements by yielding the hand and giving the horse greater freedom of movement. He maintains contact so that he can exercise gradual restraining influence with the direct rein when he feels the horse is about to spring into the trot.

To reduce the walk the rider makes use of the direct rein and legs as in coming to the halt. The step is shortened and the cadence or tempo decreased.

To extend or reduce the trot, the same means are used. The exercises in extending and reducing the gait afford excellent practice for the rider in the use of the aids and good training for the horse in obeying them, but the soldier out of ranks should use only the regulation gaits.

Changes of speed are executed at the commands: 1. **Slow walk (trot or gallop)**, 2. **MARCH**; or, 1. **Walk (trot) out**, 2. **MARCH**; or, **Extended gallop**, 2. **MARCH.** The normal speed is taken at: 1. **Walk (trot or gallop)**, 2. **MARCH.**

To increase or decrease the cadence or tempo at any gait the instructor may caution: **Extend (Reduce) the gait.**

SECTION IV.—INDIVIDUAL MOUNTED DRILL AND INSTRUCTION.

243. Wherever formation in line is prescribed in these regulations, it will be understood, unless indicated to the contrary, that line **without intervals** is intended.

TO FORM IN LINE WITH INTERVALS.

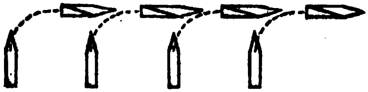
244. To form in line with intervals the instructor designates a trooper to act as the base of the formation, indicates to such trooper the point where the right of the squad is to rest and the direction in which the line is to face, takes position at a convenient distance in front of and facing the point where the center is to rest, and commands: **LEAD INTO LINE WITH INTERVALS.** The base trooper **leads out** and takes position as indicated; the other troopers lead out so as to approach the line **successively directly from the rear** and in single rank form on the line established by the base trooper, in order from right to left. The troopers form at stand to horse with intervals of 3 yards between horses.

BEING IN LINE WITH INTERVALS, TO MARCH BY THE FLANK IN COLUMN OF FILES.

245. 1. **By the right (left) flank,** 2. **MARCH.**

At the first command gather the horse.

At the command **march**, open the right rein and close both legs, the right leg a little more to the rear than the other; turn to the right by moving the horse over a quarter of a circle whose radius is 2 yards; when the turn is nearly ended diminish the effect of the right rein and leg, using the left rein and leg to straighten the horse; when the turn is completed, relax both legs and move off at a right angle to the original direction. The effect of the rein is to lead the horse in the desired direction, not to pull him back on that side.



Whenever executing the individual turn at the trot or gallop, the effect if the outer (in this case the left) leg should be increased to sustain the horse.

246. A squad marched by the flank, from line with intervals, is in column of files, with the distance of 4 feet from the head of one horse to the croup of the horse next in front.

Marching in column of files, each soldier should so conduct his horse that the soldier next in front of him shall hide all others in front; all follow in the trace of the conductor or leading file.

Distances, when lost, should be regained gradually.

If the column of files be marched by the flank, the squad will then be in line with intervals of 3 yards between files.

247. For convenience in estimating spaces, each horse with his rider is considered as occupying a space of 3 yards in length and 1 yard in width, but by measurement the horse occupies only about 8 feet in length.

248. To halt the column of files: 1. **Squad,** 2. **HALT,** and to resume the march: 1. **Forward,** 2. **MARCH.**

TO CHANGE DIRECTION.

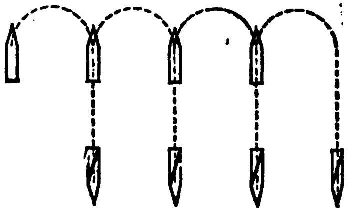
249. At a walk the changes of direction are made on the arc of a circle the radius of which is 2 yards. At fast gaits, where the horse is more or less extended and therefore harder to bend, the radius of the turn must be correspondingly increased.

250. Being in column of files: 1. **Column right (left);** or, 1. **Column half right (half left),** 2. **MARCH.**

The leading man turns or half turns to the right at the command of execution and marches in the new direction; the other men move forward and turn successively on the same ground.

THE INDIVIDUAL ABOUT.

251. Being in line with intervals, or in column of files: 1. **Right (left) about,** 2. **MARCH.**

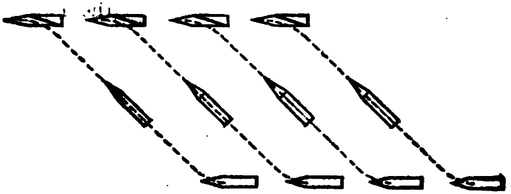


Each man turns his horse on a half circle whose radius is 2 yards, and then moves off in the new direction, to the former rear.

TO OBLIQUE.

252. Being in line or in column of files: 1. **Right (left) oblique,** 2. **MARCH.**

Each man turns his horse half right on an eighth of a circle, and then moves at an angle of 45° to his former direction.



To resume the original direction: 1. **Forward,** 2. **MARCH.** Each man turns half left and then moves forward.

TO TURN ON THE FOREHAND.

253. Being in line or column at the halt: 1. **On the forehand,** 2. **To the right (left),** or, 2. **To the right (left) about,** 3. **MARCH.** The horse is first put up against the bit, or gathered. The rider then takes a slight set of the head toward the side of the turn. The inner right leg is applied behind the girth and when necessary is accompanied by the action of the inner rein. The haunches are swung step by step around the opposing forehand until a turn of 90° or 180°, respectively, is completed. Every step of the haunches is regulated accurately by the outer supporting leg applied behind the girth in such a manner that there is a decided pause between steps, thereby preventing the haunches from rushing. Both during and after the movement the rider's legs and seat should insure that the horse does not back but remains up against the bit. A stepping forward usually indicates a falling out of the outer shoulder and must be counteracted by the outer rein. The inner rein should not act so strongly as to bend the neck, except in case of a green horse that does not understand the leg aids, or with a horse that offers resistance.

The turn on the forehand is not a real schooling lesson, because the haunches are disburdened and the horse thrown on the forehand. For this reason it should not be repeated very often.

As a rule, turns on the forehand are practiced only in the early training of the horse. Their principal purpose is to teach the rider the correct use of the sideward driving inner leg aid, the inner rein, and the outer supporting leg and rein.

As the movement has a great tendency to make the horse reluctant in going up promptly against the bit, the turn should be always immediately followed by a movement to the front at a free walk or at a trot, and it should never be exacted of young horses until the straight-ahead movement has been well confirmed.

TO TURN ON THE HAUNCHES.

254. Being in line or column at the halt: 1. **On haunches,** 2. **To the right (left),** or, 2. **To the right (left) about,** 3. **MARCH.** The rider puts his horse against the bit, gathers him, and sets the head to the side of the turn. The inner right rein begins and induces the turn, then carried well away from the neck, leads the forehand step by step around the haunches through a turn of 90° or 180°, respectively. The inner right hind foot must be kept in place during the turn. To accomplish this, the outer rein should be reined in in the direction toward this foot. The outer hind foot must be prevented from falling out by the supporting action of the outer leg. Both of the rider's legs, but especially the inner one, prevent the horse from stepping back during the turn. It is a lesser mistake if the horse steps forward. The rider should place a little more of his weight on the inner buttock.

The instructor must see that the rider's legs and weight are placed as above described and that the tendency to let the legs fly away from the horse's sides be completely overcome.

TO TURN ON THE FOREHAND IN REVERSE.

255. Marching on the track to either hand: 1. **Reverse,** 2. **MARCH.** At the command **march** the rider leaves the track by an oblique. Having advanced far enough in this direction to place him from 6 to 15 yards from the track, the instructor adds **NOW,** whereupon the rider moves his horse back to the track over the arc of a half circle whose diameter is the distance thereto and retakes the track in the opposite direction.

Application of the aids.—At the moment the half circle is begun the aids are applied and the horse is bent as if to march on this circle. Immediately thereafter the inside leg is slipped in rear of the girth to the sideward driving position and is applied to drive the haunches outward so that they describe an outer and larger circle than the forehand. The outer leg takes a supporting position behind the girth to prevent the haunches from coming around too fast. The swing of the haunches should be slight as the half circle is begun and should then increase as the track is approached. The lateral drive should be strongest when the forehand has almost reached the track, and the haunches are about 1 yard from it.

With recruits and remounts the turn should be made on a large continuous curve. The horse is therefore changing direction while gaining ground to the front. The diameter of the half circle described by the forehand is never less than 6 yards.

The principal object of this movement is to teach the horse to yield to the inside aids, especially the sideward driving leg. It is therefore of great value to teach the rider the coordination and use of these aids and to get control of the haunches of his horse.

TO REIN BACK.

256. Being in line at the halt: 1. **Backward**, 2. **MARCH**, 3. **Squad**, 4. **HALT.**

At the command **backward**, gather the horse.

At the command **march**, keep a firm seat, hold both legs close; carry the weight of the body slightly to the rear, and at the same time rein in gradually until the horse yields to the pressure of the bit and steps to the rear; then immediately yield the hand slightly to allow the horse to regain his balance and relax the legs; continue in the same manner to yield the hand and relax the legs, and rein in and close the legs, giving slight indication to the rear with the weight of the body, so as to keep the horse in continuous motion.

This movement should be frequently practiced to keep the horse light and collected.

If the horse raises his nose and throws his weight on his haunches without stepping back, hold the hands low and play the reins with light, rapid motions of the hands until he yields.

If the horse throws his haunches to the right, close well the right leg. If to the left, close well the left leg. If this be not sufficient to put the horse in proper position, open the rein on the side toward which he throws his haunches, supporting him at the same time with the other rein.

TO FORM IN LINE.

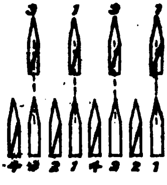
257. To form in line, the instructor designates a trooper to act as the base of the formation, indicates to such trooper the point where the right of the squad is to rest and the direction in which the line is to face, takes position at a convenient distance in front of and facing the point where the center of the squad is to rest, and commands: **LEAD INTO LINE.** The base trooper **leads out** and takes position as indicated; the other troopers lead out so as to approach the line **successively directly from the rear** and in single rank form on the line established by the base trooper, in order from right to left. The troopers form at stand to horse, with intervals of 18 inches between horses.

Line having thus been formed, the leader commands: **COUNT FOURS.**

At this command all except the right or base trooper turn the head and eyes to the right. Beginning on the right, troopers count: One, two, three, four; each turning his head and eyes to the front as he counts.

TO MOUNT IN LINE.

258. The instructor commands: 1. **Prepare to mount,** 2. **MOUNT,** 3. **Form,** 4. **RANK.**



At the first command, the odd **numbers,** stepping off with the left foot, lead their horses 4 yards straight to the front, regulating by the right; all then prepare to mount.

At the command **mount,** all mount.

At the command **rank,** the even numbers move up in the intervals without jostling or rushing. In forming rank, both mounted and dismounted, the odd numbers hold their horses' heads well up to prevent kicking.

TO DISMOUNT.

259. 1. **Prepare to dismount,** 2. **DISMOUNT,** 3. **Form,** 4. **RANK.**

At the first command, the odd numbers gather their horses and move forward 4 yards, and all prepare to dismount.

At the command **dismount,** all dismount.

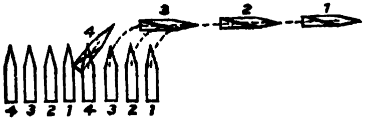
At the command **rank,** the even numbers move up in the intervals.

TO MARCH FROM LINE TO THE FLANK IN COLUMN OF FILES.

260. Being at the halt: 1. **By file, by the right (left) flank,** 2. **MARCH.**

At the first command the man on the right gathers his horse.

At the command **march,** he turns to the right and moves forward in the new direction. The second man from the right gathers his horse when the first begins to move, he turns to the right so as to follow the first at the distance of 4 feet from head to croup. The movement is executed in succession by the other men as explained for the second.



If marching, all halt at the command **march,** except the man on the right. The movement is then executed as before.

TO MARCH FROM LINE TO THE FRONT IN COLUMN OF FILES.

261. Being in line at a halt: 1. **By file,** 2. **MARCH.** Executed as explained above for marching to the flank except that the file on the right moves straight to the front, followed in trace by the second and other men.

TO PASS FROM THE FRONT TO THE REAR OF THE COLUMN.

262. Being at the walk, to teach the troopers the application of the aids: 1. **First man from front to rear,** 2. **MARCH,** 3. **NEXT.**

At the first command, the leading man gathers his horse.

At the command **march**, he leaves the column by the right or left about, according as he is marching to the right or left hand, moves parallel to the column, and enters it again by another about.

The men in succession execute the same movement at the command **next**, which is repeated by the instructor until all the men have passed from front to rear.

TO PASS FROM THE REAR TO THE FRONT OF THE COLUMN.

263. Being at the walk: 1. **Last man from rear to front,** 2. **Trot,** 3. **MARCH,** 4. **NEXT.**

At the command **trot**, the man in rear gathers his horse.

At the command **march**, he leaves the column by an oblique, takes the trot, moves parallel to the column, enters it again at the front by another oblique, and resumes the walk, and so on for the others, each moving out at the command **next.**

Should the man enter the column at too great a distance in front of the leading trooper, he slackens the walk until at the proper distance.

TO MARCH IN CIRCLE.

264. Marching to the right, and the conductor being at least 17 yards from a corner: 1. **Squad,** 2. **Circle to the right (left),** 3. **MARCH.**

At the first command, the conductor gathers his horse.

At the command **march**, he describes a circle between the two tracks; the other men follow, each gathering his horse before entering upon the circle. keeping him there by the inner rein, and closing the leg on that side. If at the fast trot or gallop, the haunches should be sustained by the outside leg.

265. While circling, the squad may change gaits, be halted in column, and put in march, as when marching on the track.

To change hands: 1. **Column right (left),** 2. **MARCH.**

The squad passes over the diameter of the circle and circles in the opposite direction by the commands: 3. **Column left (right),** 4. **MARCH,** the command **march** being given when the conductor is 2 yards from the circumference.

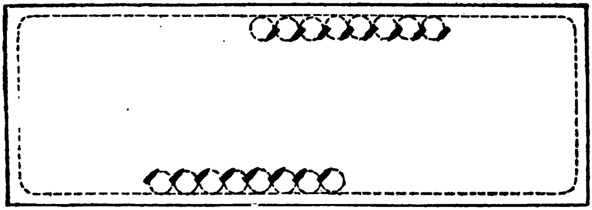
To march again on a straight line, the instructor commands: 1. **Forward,** 2. **MARCH,** when the conductor arrives on the long side of the track.

INDIVIDUAL CIRCLING.

266. Marching to the right (left) hand on the long side of the hall: 1. **Individual, circle to the right (left),** 2. **MARCH.**

The men should make one circle only, should complete it at the same time, and take the track to the same hand as when the movement began. The instructor should make the circle larger in the beginning, and as the instruction progresses make it smaller.

When marching on the circle to the right, each man opens the right rein and closes both legs; when marching at the trot or gallop, he closes the left more than the right, to sustain the horse.



If the commands: 1. **Squad,** 2. **HALT,** be given, the men halt their horses facing in the same direction as the conductor.

TO MOVE AT THE SLOW TROT.

267. 1. **Slow trot,** 2. **MARCH.**

The gait is slow, and the instructor sees that the men feel lightly their horses' mouths **without bearing upon the reins,** and explains that the necessary ease and stability are acquired by sitting well down on the horse, or saddle, and partially relaxing the body, thighs, and legs, the hands feeling lightly the horse's mouth.

He requires the men to preserve their seats by balancing the body; that they avoid the common fault of leaning the body too far or curving the back to the rear; that they sit erect and keep the legs close to the horse.

The movements already taught at the walk are repeated at the trot. In turning by file to the right or left, the instructor sees that the trot is neither slackened nor increased.

TO TROT OUT.

268. Being at the slow trot: 1. **Trot out,** 2. **MARCH.**

Gather the horse, then yield the hands and close the legs by degrees until the horse gradually increases the gait to the trot.

The instructor sees that the horses are kept up to the proper gait and pays particular attention to the position of the men; if their seats become too much deranged, he brings the squad to the slow trot or to the walk; this is especially important in the earlier instruction of recruits.

269. To resume a moderate trot: 1. **Slow trot,** 2. **MARCH.**

Rein in by degrees until the horse moderates the gait, closing the legs to prevent his taking the walk.

The greater part of the work without saddles or stirrups should be given at the slow trot, as it is unnecessarily fatiguing and difficult to sit at a fast trot without the saddle or stirrups.

270. In riding at a slow trot, those undergoing instruction will "sit tight in the saddle," i. e., maintain contact therewith with the buttocks. In riding at the regulation trot it is prescribed that posting or rising to the trot, as hereinafter explained, be employed.

POSTING.

271. Posting, or rising to the trot, greatly diminishes the concussion produced by the rider's weight on the back and joints of the horse. It also makes breathing easier and facilitates the impulsion from the engagement of the hind feet. It is also less fatiguing to the rider than sitting down to the trot.

Posting is habitually employed by the rider, and should be learned during this period of the instruction.

It is executed as follows: The horse moving at a trot, the rider inclines the upper part of his body forward, then supporting himself on the stirrups while maintaining the grip of the knees, he rises under the impulsion of the horse, maintaining his position detached from the saddle while the succeeding impulse is produced, again sits down in the saddle, shoving his buttocks forward in doing so, and continues in this way, always avoiding every other impulse.

At the beginning the mechanism of posting is made easier to the rider by causing him to stroke the horse's neck or to grasp a lock of the mane or the pommel with either hand, thus determining the forward inclination of the body.

Its proper execution requires that the seat shall be raised moderately; that contact with the saddle shall be resumed gently and without shock; that the full support of the stirrup is obtained, while keeping the lower leg steady; that the ankle joint shall be supple; and that the heel shall be kept lower than the toe. Above all, the rider must be supple in the loins and convex them backward.

CHANGING THE DIAGONAL IN POSTING.

272. In posting the rider is said to post on the right diagonal when after rising he sits down in the saddle at the instant the right fore foot comes to the ground.

It is important to instruct the rider to post for a time on one diagonal and then change to the other, so that the horse's legs will each perform the same amount of work and the chance of injury from the equipment will be reduced.

In the riding school the rider should always ride on the inside hind foot, because this foot, in response to the inner leg aid, is the only one that can properly place itself under the mass of the horse and support the weight during the change of direction in the corners; hence to insure automatically that the posting is done as much on one diagonal as on the other the riders may be required to post on the left diagonal when riding to the right hand on the track and on the right diagonal when riding to the left.

The instructor occasionally requires each rider to inform him on which diagonal he is posting.

To teach the rider to change the diagonal, the instructor directs him to diminish the weight borne on the stirrups and to retain his seat in the saddle for two successive beats of the horse's feet instead of one, and then to rise as before.

The rider will then find himself posting on the diagonal opposite to the one on which he was posting before.

TO GALLOP.

278. 1. **To 3 yards take distance,** 2. **TROT,** 3. **MARCH.**

The leading man takes the trot; each of the other men in succession takes the trot when the one in front of him has gained the distance of 3 yards.

This precaution is taken to prevent the horses running upon each other and causing confusion.

1. **Gallop;** or, **canter,** 2. **MARCH.**

At the command **gallop,** gather the horse.

At the command **march,** close both legs and rein in with a firm, light hand (this is to bring the haunches under), then carry the bridle hand to the left and press the left leg with vigor; these actions throw the weight on the near hind leg and allow the off fore and hind feet to lead; as soon as the horse rises, give the hand and relax the left leg; reining in slightly and closing the legs with light pressure will keep the horse at the gait and up to the hand; a dead pull should be avoided; if the horse leans on the hand, yield the hand and play the reins a little, then close the legs and rein in a little abruptly; as soon as the horse obeys, yield the hand.

For recruits the gait at first is restricted to the canter.

To keep the horse true the rider must accommodate himself to all the horse's motions, sustaining him slightly with the outside leg, particularly in changing direction at the corners. When a horse gallops false or disunited, his rider is ordered to leave the clumn, come to the trot, and pass to the rear of the column, taking care not to interfere with the other men; arriving at the rear he resumes the gallop, the instructor explaining how to keep the horse true. The gallop to each hand will be kept up only once or twice around the riding school, the horses being brought to the trot before changing hands.

In turning corners at a fast gait there is danger that the horse will fall down. If his haunches swing out, he will change so as to gallop disunited, and the danger of his falling will be increased. To prevent this the man should keep the outside leg closed strongly and not lean in, but maintain a vertical position.

The instructor will not at first dwell upon the mechanism of the gait, but allow each rider to accommodate himself to the motion of the horse without losing his seat.

The men must keep their horses steady; when able to manage them properly at the gallop the distance of 4 feet from head to croup is gradually resumed.

In order to make it easier for each man to start his horse true, the instructor will find it advantageous to march the squad in line with intervals across the hall at the trot, and, upon approaching the track, command: 1. **By the right flank**, 2. **Gallop**; or, 2. **Canter**, 3. **MARCH.**

Or, give the command **gallop** or **canter** when the squad is circling at the trot.

When the men have been sufficiently exercised at the gallop on straight lines and in circling, they are exercised at the gallop in marching by the flank and circling by man, the instructor taking care that the turns are not made too short; that the men keep their horses true, and that they do not derange their positions.

TO PASS FROM THE CANTER TO THE GALLOP, AND THE REVERSE.

274. Being at the canter: 1. **Gallop**, 2. **MARCH.**

Give the hand and close the legs by degrees until the horse increases his gait to the gallop; when the proper cadence is attained, the instructor pays particular attention to the positions of the men; if their seats become too much deranged, he brings the squad to the canter or to the trot.

To resume the canter: 1. **Canter**, 2. **MARCH.**

Rein in by degrees until the horse moderates the cadence, closing the legs to prevent his taking the trot.

TO PASS FROM THE GALLOP OR CANTER TO THE TROT.

275. 1. **Trot,** 2. **MARCH.**

At the command **trot**, gather the horse.

At the command **march**, rein by degrees and hold the legs close; as soon as the horse trots, replace the hand gradually and relax the legs.

JUMPING.

276. For this exercise the height of the bar should at first be 1 foot, and the width of the ditch 2 feet. As the men and horses become used to jumping, the height of the bar and the width of the ditch are gradually increased, the bar to 3 feet and the ditch to 5 feet; this exercise should generally be practiced near the end of each drill.

A horse that hurries or rushes will become an uncertain and unsafe jumper. If impatient in going up to the bar, he should be halted, reined back, halted and tried again until he takes it coolly.

277. Horses are taught to jump the ditch and the bar. They are equipped with the snaffle bit and are led by a steady horse that is accustomed to jumping.

This instruction is also given on the longe.

The horses are taken in the open field and practiced at jumping shallow ditches, fallen logs, very low fences, etc. If the horse refuses to take the jump, the instructor may give aid with the whip, but in such a way as not to terrify him. If the horse be timid, it is advisable to place the bar on the ground until he passes over it without alarm. Great discretion must be used in applying the whip, and the horses will not be required to jump repeatedly over the same thing or at the same place.

278. The instructor forms the squad in line, about 30 yards from the obstacle, and commands: 1. **First file from the right (left)**, 2. **MARCH**, 3. **NEXT.**

The man on the right moves to the front at the walk; he takes the trot when he has passed over about one-third the distance, and then the gallop.

After making the jump, he takes the trot, then the walk, and takes his place in the rank, which is re-formed about 30 yards beyond, and on the right or left of the obstacle, and facing it.

The other men move out successively from the right at the command **NEXT.**

279. In the riding hall the men are formed in two squads, in line, facing each other at opposite ends of the hall; two bars are placed across the track, one on each of the long sides of the hall, about midway.

1. **First file from the right** (left), 2. **MARCH**, 3. **NEXT.**

The man on the right of each squad moves out at the walk and marches diagonally across the hall; on passing each other both take the trot and when abreast of the flank of the opposite squad they take the track at the gallop or canter, the horse leading with the right foot; after jumping both bars, each man takes the trot, then the walk, passes around the left flank of the opposite squad, marches at the walk diagonally across the hall, and forms on the left of his squad.

280. The other men move out successively from the right or left of each squad at the command **NEXT.**

This rule is general for individual exercises.

281. In making the flying jump, the horse must not be hurried nor allowed to rush, but be held steady and straight for the bar or other obstacle. The rider should sit down snugly in the middle of his saddle, the horse firmly inclosed between the legs, the hands held low and steady, and the body not forward, and thus ride steadily and smoothly at the obstacle. The muscles of the back and shoulders should not be contracted. The waist should be supple, so as to adopt in its motion the movement of the horse.

TO JUMP THE DITCH.

282. Ride straight for the ditch at a steady, animated gait, with the legs closed firmly; the instant the horse springs, give the hand, and as he grounds sustain him with a light, steady pressure.

283. The instructor must observe that the rider does not thrust his weight into the stirrups nor throw out his elbows, nor check his horse too abruptly. If the hand is held so that the back of the hand is nearly vertical with the ground, there will be little tendency to turn out the elbows. If the horse is checked with a sudden violence after making the jump, he takes it as a punishment, and may thereafter try to avoid the obstacle.

Beginners are apt to try to sustain themselves by the reins; to prevent this the instructor may find it necessary to allow them to place the bridle hand on the horse's neck until they have gained confidence. If necessary the bar should be lowered to the height at which the rider can easily keep his seat.

The rider will be practiced jumping obstacles without stirrups and without saddles.

SECTION V.—ELEMENTARY COLLECTIVE INSTRUCTION MOUNTED.

ALIGNMENTS.

284. Being in line, mounted: 1. **Right** (left), 2. **DRESS**, 3. **FRONT.**

At the command **dress** all the men move up slowly on the basis of the alignment established by the instructor, each casts his eyes to the right so as to see the buttons on the breast of the second man from him, sits squarely on his horse, keeps his horse straight in ranks, and touches lightly with his stirrup the stirrup of the man on his right. At the command **front**, given when the last man is aligned, all cast their eyes to the front. All movements in ranks must then cease.

In dressing the first two or three men are accurately aligned as quickly as possible, in order to afford a base for the rest of the squad.

This rule is general.

TO MARCH IN LINE.

285. Being in line at the halt: 1. **Forward**, 2. **MARCH.** The squad moves off promptly, the guide marching straight to the front at the regular gait.

The instructor observes in marching in line that the squad marches straight to the front at the regular gait; that the men keep their horses straight in the rank; that they maintain the interval of about 6 inches from knee to knee or light touch with stirrup toward the side of the guide; that they yield to pressure from that side and resist pressure from the opposite direction; that if too much closed toward the guide they carry the bridle hand from that side, and close the leg on the side of the guide; that if the interval be too great they carry the hand toward the guide, and also close the leg on the opposite side, and, while habitually keeping the head to the front, they occasionally glance toward the guide. If in advance, they rein in gradually. If in rear, they gradually increase the gait until the alignment is regained.

286. Marching in line, to effect a slight change of direction: **INCLINE TO THE RIGHT (LEFT).**

The guide turns his horse slightly to the right and marches in the new direction. The other men gradually conform to the movements of the guide, increasing or diminishing the gait according as the change is toward or opposite the side of the guide.

TO HALT.

287. Whenever the squad is in motion, it is halted by the commands: 1. **Squad,** 2. **HALT.** This rule is general, the command **section, platoon, company,** being substituted for **squad.**

TO MARCH BACKWARD.

288. 1. **Backward,** 2. **MARCH.**

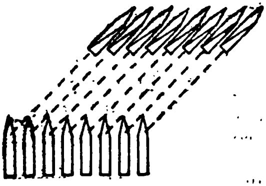
All the men rein back, dressing on the guide.

This movement is used for short distances only.

TO OBLIQUE.

289. 1. **Right (left) oblique,** 2. **MARCH.**

At the command **march** each man executes a turn of 45° to the right, his right knee in rear of the left knee of the man on his right. The squad moves in the new direction, regulating by the right, in a line parallel to the original front.



To resume the original direction: 1. **Forward,** 2. **MARCH.**

Each man turns 45° to the left and marches straight to the front, regulating on the guide.

TO TURN AND ADVANCE.

290. Being in line at the halt or at the walk, the instructor commands: 1. **Right** (left) **turn**, 2. **MARCH.** The man on the right turns his horse 90° to the right, on an arc with a radius of 2 yards, and moves forward in the new direction without increasing the speed. Each of the other men turns his horse to the right approximating an oblique, and, moving at the trot by the shortest line, places himself on the new line, when he takes the gait and direction of the pivot man. During the turn the guide is, without command, on the pivot flank. The guide is announced when all men have arrived on the line. If marching at a trot, the pivot man continues at the trot. All others move at the gallop. If marching at the gallop, the pivot takes the canter; all other men continue the gallop, each taking the canter on arriving in line; as soon as all the men have arrived on the line all resume the gallop.

BEING IN LINE AND HAVING COUNTED FOURS, TO FORM COLUMN OF FOURS TO THE FRONT.

291. 1. **Right** (left) **by fours**, 2. **MARCH.** The right four moves straight to the front, the other fours oblique to the right, so as to follow the preceding four at the proper distance of 4 feet from head to croup.

If marching, rule 2, paragraph **434**, applies for gaits.

BEING IN LINE AND HAVING COUNTED FOURS, TO FORM COLUMN OF FOURS TO THE FLANK.

292. 1. **Fours right** (left), 2. **MARCH.**

Each four executes **RIGHT TURN**, as explained in paragraph **290**, and all march off in the new direction.

TO CHANGE DIRECTION.

293. Being in column of fours: 1. **Column right**, 2. **MARCH.** The leading four executes right turn, the other fours move forward and turn on the same ground as the first. **Column half right** is similarly executed, except that the leading four makes a half turn.

BEING IN COLUMN OF FOURS, TO MOVE TO THE REAR.

294. 1. **Right about,** 2. **MARCH.** The leading four turns to right about, the pivot trooper marching on a circle whose radius is 2 yards, the others conforming. The other fours move forward, and, following the first, turn on the same ground.

BEING IN COLUMN OF FOURS, TO FORM LINE TO THE FRONT.

295. 1. **Left (Right) front into line,** 2. **MARCH.** The leading four moves straight to the front, each of the rear fours obliques to the left until the preceding four is uncovered, when it moves straight to the front until it arrives on the line.

Rule 1, paragraph **434**, applies for gaits.

BEING IN COLUMN OF FOURS, TO FORM COLUMN OF TWOS TO THE FRONT.

296. Being at a halt: 1. **By twos,** 2. **MARCH.**

The right two, Nos. 1 and 2 of the leading four, moves straight to the front, the left two, Nos. 3 and 4 of the leading four, keep their horses' heads straight until their horses' heads are passed by the croups of the horses of the right two, when they oblique to the right and follow the leading two, at a distance of 4 feet. Each of the other fours form in the same manner as soon as the left two in the preceding four commences to oblique. Nos. 3 and 4 always follow in rear of Nos. 1 and 2, no matter on which side the guide may be.

If marching, Rule 2, paragraph **434**, applies for gaits.

BEING IN COLUMN OF FOURS, TO FORM COLUMN OF FILES.

297. 1. **By file,** 2. **MARCH.**

The movement is executed according to the principles of the preceding paragraph. No. 1 of the leading four moves forward and is followed successively by Nos. 2, 3, and 4, who preserve a distance of 4 feet from head to croup. When No. 4 commences to oblique, No. 1 of the succeeding four marches forward or takes the increased gait.

Column of files from column of twos is formed in similar manner, No. 1 leading the column.

BEING IN COLUMN OF TWOS, TO FORM COLUMN OF FOURS.

298. Being at the halt: 1. **Form fours,** 2. **MARCH.** Nos. 1 and 2 of the leading four move straight to the front. The instructor commands **halt** when the leading two have moved 3 yards. Nos. 3 and 4 of the leading four oblique to the left until uncovered, then march to the front and halt when abreast of Nos. 1 and 2. The other twos march forward and form fours successively as explained for the first four. Nos. 3 and 4 of each four commence the oblique to the left when Nos. 1 and 2 are at 3 yards from their position.

If marching, rule 1, paragraph **434**, governs the gaits.

BEING IN COLUMN OF FILES, TO FORM COLUMN OF FOURS OR TWOS.

299. 1. **Form fours,** 2. **MARCH.**

The movement is executed on the same principles as in forming fours from column of twos, No. 1 of each four being the base, and Nos. 2, 3, and 4 obliquing to the left and forming on the left of No. 1.

300. 1. **Form twos,** 2. **MARCH.** The movement is executed on the same principles as in forming fours, Nos. 1 and 3 being the base men, No. 2 forming on the left of No. 1, and No. 4 on the left of No. 3.

MOVEMENTS IN COLUMN OF TWOS.

301. The column of twos changes direction, halts, and advances by the same commands and means as a column of fours.

BEING IN COLUMN OF FOURS, TO DISMOUNT.

302. Being at the halt or marching: 1. **Prepare to dismount,** 2. **DISMOUNT.**

At the first command, Nos. 1 and 2 open to the right and front, Nos. 3 and 4 to the left and front, and all halt. Each four opens only so far as to allow sufficient room for each man to dismount without interference from the others. Nos. 1 and 4 open a little more than 2 and 3.

The column of twos dismounts by the same commands and means. In mounting from column of twos or fours the horses are opened out as in the preceding paragraph at the preparatory command for mounting. At the commands **Forward, March**, either before or after mounting, the column moves forward, the files closing toward the center.

MANUAL OF THE PISTOL.

303. The instruction under this head will conform to what has already been described in The Soldier Dismounted.

SECTION VI.—ADVANCED EQUITATION.

304. When the elementary individual and collective instruction has progressed to such a point that it is deemed desirable to undertake the execution of exercises with greater attention to detail and instruction in the refinements of equitation, the following means and methods are prescribed, to which may be added, in the discretion of the instructor, such others as may be suitable, and which are not inconsistent with the provisions of these regulations.

SPECIAL EXERCISES ON TWO TRACKS.

305. One-track movements are those in which the hind feet track with the forefeet. Two-track movements are those in which the horse is compelled to take an oblique position to the direction of march, and his forefeet and hind feet travel on two parallel tracks. All two-track movements are but a means to an end, which is to increase the obedience, strength, suppleness, and hardiness of the horse. When practiced as a specialty or too intensively, they do positive harm, in that they reduce the natural tendency to go forward.

All two-track movements are very fatiguing and should not be prolonged beyond a few steps. They should be executed at gaits not faster than the slow trot. When taken up, the men should have acquired good seats and should have learned independence in the use of the aids.

HAUNCHES RIGHT OR LEFT.

306. Marching to the right hand with three lengths distance between riders: **HAUNCHES RIGHT (LEFT).**

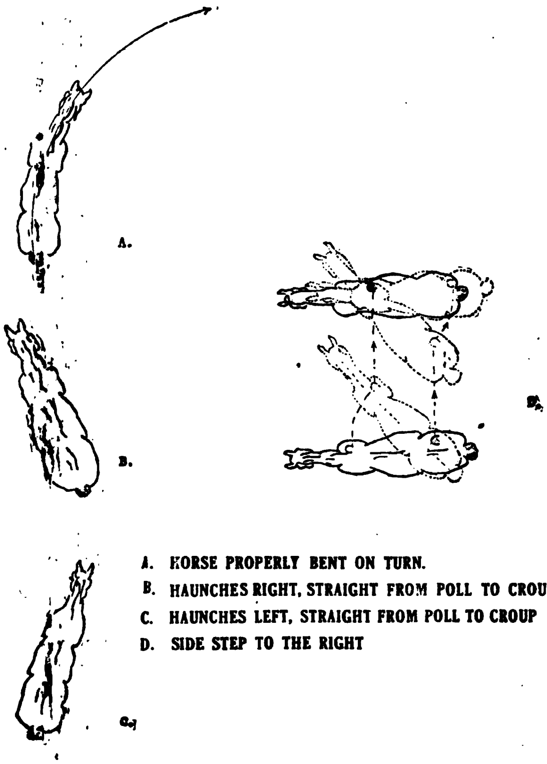
The command is given as the leading rider approaches the second corner of a short side of the school. Each rider, as he comes onto the long side, executes the movement for a few steps, discontinuing it at the command **STRAIGHT** by the instructor.

307. Application of the aids.—As the forehand reaches the track on the long side, the rider gives a half halt and gets the horse well up between his legs and reins. To begin the movement, it may be necessary to set the horse's head slightly to the left by the direct action of the left rein. The left leg takes the sideward driving position and is applied with an alternating pressure in unison with the lifting of the left hind leg. It forces and keeps the haunches the desired distance from the track. This leg is also responsible for driving the horse forward. The right leg, applied at the girth, limits the displacement of the haunches. It prevents the horse from running from the opposite leg, from losing the cadence, and his forehand from leaving the track. It also assists in maintaining the collection and in holding the horse up against the bit. The reins maintain the direction and keep the neck straight. The right rein leads and is opened only so much as is necessary to give the direction; the left rein held low is closed and prevents the neck from bending. The weight is shifted slightly in the direction of motion.

At the command **straight**, the horse is pushed to the track on a flat curve and then driven straight ahead.

The movement is properly executed when the horse is straight from poll to croup, but is set at an oblique to the direction in which he is moving. The front and hind feet travel on two parallel tracks, the left fore and left hind stepping in front and across the right fore and right hind. The displacement of the haunches is very slight at first, and at no stage should reach more than 45°.

Haunches left may be executed when marching to the same hand. In this case the rider passes through the second corner and turns onto the diagonal of half the school. The movement



A. HORSE PROPERLY BENT ON TURN.
B. HAUNCHES RIGHT, STRAIGHT FROM POLL TO CROUP.
C. HAUNCHES LEFT, STRAIGHT FROM POLL TO CROUP
D. SIDE STEP TO THE RIGHT

is begun and similarly executed just as the haunches are about to leave the track. The haunches travel along the track while the forehand moves on a line parallel to and inside of it. When the displacement exceeds 45°, the forward tendency is destroyed and the movements become cramped, while the excessive crossing of the feet may be the direct cause of leg injuries that will develop harmful resistance.

HAUNCHES IN OR OUT.

308. Marching to the right hand with three lengths distance between riders: 1. **HAUNCHES IN (OUT).**

The command is given as the leading rider approaches the second corner of a short side of the school. Each rider individually, as he comes onto the long side, executes the movement for a few steps, discontinuing it at the command **STRAIGHT** by the instructor.

Application of the aids.—On passing through the corner the rider executes a half halt as the forehand reaches the track of the long side, and then begins the movement. The horse is uniformly bent from poll to croup around the right leg applied at the girth. The forehand strides straight to the front on the track, while the haunches are displaced to the inside, the left hind stepping across and in front of the right hind. The right rein is shortened and maintains the necessary set of the head and leads the horse in the direction of march. The right leg in combination with the right rein produces and maintains the proper bend. The left rein regulates the bend, fixes the neck at the shoulders, keeps the left shoulder from falling out, and supports the action of the outer leg. The left leg applied behind the girth displaces the haunches to the desired degree and maintains the forward drive. The weight is slightly displaced in the direction of motion.

At the command **straight** the horse is brought back onto the track by closing both legs, the inner predominating, and driving the horse forward in the direction of the forehand as on the circle.

Haunches out, when ridden on a straight line, is exactly the same as **haunches in.** It is developed by first leading the fore-

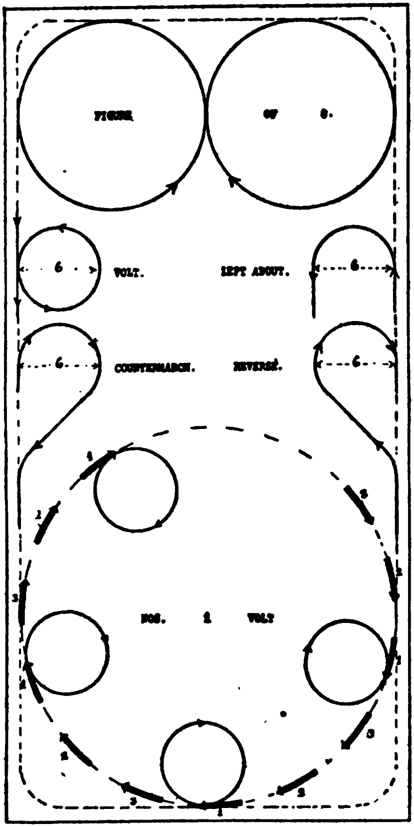


FIGURE OF 8.
6
VOLT.
LEFT ABOUT.
6
6
COUNTERMARCH.
REVERSE.
6
NOS. 1 VOLT
1
2
3

hand off the track to the inside, and then displacing the haunches outward.

In haunches in or out, the bend throughout the body depends upon the training of horse and man. For the work herein prescribed it should be slight, it being sufficient if the outside hind foot track with the inside fore.

SIDE STEPPING.

309. In this movement the horse steps sideward on the line of the original front. It is used in closing in when in line. Being in line with intervals of one horse length: **1. Side step to the right (left)**, 2. **MARCH**, 3. **HALT.**

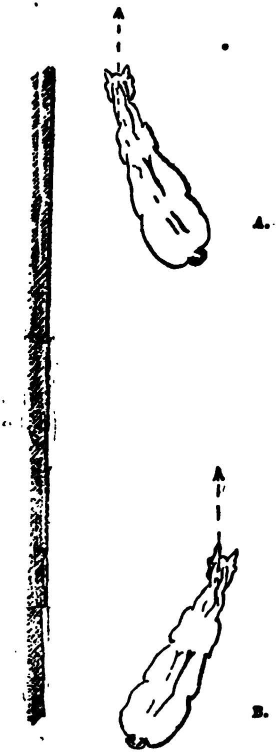
Application of the aids.—The rider gathers his horse, sets him, and applies the aids to turn him on his haunches to the right through an angle of 45°. He then applies the aids as in **haunches right** and moves the horse on two tracks parallel to the original front until the instructor commands **halt.** At this command the horse is halted and the aids applied to turn him 45° to the left on the forehand. The horse will then be about one pace behind the line, and is therefore straightened, moved forward up to, and halted on it.

THE RIDING SCHOOL.

General Provisions.

310. The riding school is a convenient and favorable place for teaching the rider the proper application of the aids. It is also looked upon as a gymnasium for training and schooling horses, for promoting their physical development, improving their balance and gaits, and confirming their obedience to the aids. However, whether the object be the training of rider or horse, there must be a judicious interchange of work in the school, in the outside rectangle of large dimensions, and work on the road and over varied terrain.

In order to teach the application of the aids or to confirm obedience thereto it is absolutely necessary for the rider to prescribe accurately the path on which his horse is to move. If this is not done the rider becomes careless and inattentive, while



A. HAUNCHES-IN, UNIFORM BEND FROM POLL TO CROUP.

B. HAUNCHES-OUT. UNIFORM BEND FROM POLL TO CROUP.

his horse soon acquires bad habits, shows lack of obedience and slouchiness of gaits and manner, and the great benefits to be derived from work in the school are lost. The most valuable means of counteracting this tendency is to place distinctive marks on the walls of the school, these serving as points of direction upon which the rider can guide his horse and so execute the movements or figures with almost geometric accuracy. These marks should be at a sufficient height to enable every man in the section, even when covering in column, to see them.

The sides of the riding school are called the long and short. A good proportion is two to one. A favorable size is 32 by 64 yards. This is sufficiently and conveniently large for a section of 20 men, and in case of necessity can be used for one of 30 men. The points at which to place the distinctive marks in a school of these dimensions are shown in plate 3.

In a riding school, unless otherwise indicated, the men ride at a distance of one horse length, and in passing the rule is to give way to the right.

When a riding hall is not available, this work may be conducted on the outdoor rectangle as described in paragraph **159.**

Exercises.

311. The following exercises, though especially good, are not the only ones that may be employed. The instructor may supplement them by others, always bearing in mind that the exercise employed should be for some definite object and should be looked upon merely as a means to an end. It is of advantage to make use of a great many different exercises, as by so doing interest is increased.

To make an explanation or to give instruction to all the men at the same time, the instructor by appropriate signal or command gathers his pupils about him, dismounting them if desirable.

312. TAKE THE TRACK, or **TAKE THE TRACK TO THE RIGHT (LEFT) HAND IN REAR OF (such soldier):** The track is that part of the school extending 1 yard within the sides of the walls, the corners being rounded off on an arc whose radius is 3 yards. At the extended gaits the radius is increased to 7 yards for the trot and 11 yards for the gallop.

313. TAKE THE INSIDE TRACK: This track is indicated by the marks placed 4 yards from each corner. The command is given as the leading rider approaches a corner at which place the change is made on a turn. To ride any other inside track the instructor adds **(so many) yards from the wall.**

314. To pass from the track to the track of half the school: **TAKE THE HALF TRACK.** The command is given as the leading rider approaches the open side of the half track, and the section then rides on a quadrilateral in half the school.

To resume the track: **TAKE THE TRACK.** The leading rider on again reaching the track remains on it without change of cadence or gait.

315. CHANGE HANDS: The command is given as the leading rider approaches the second corner of a short side; having turned through this corner, he leaves the track at the 12-yard mark, crosses to and takes the track at the diagonally-opposite 12-yard mark. If the men are in two squads, the leading riders pass each other by going to the right.

316. THROUGH HALF THE SCHOOL, CHANGE HANDS: The command is given before the leading rider reaches the second corner of a short side or before he reaches the middle of a long side. The change is made from the 12-yard point beyond the second corner of a short side to the middle of the opposite side or the reverse.

317. DOWN THE CENTER, CHANGE HANDS: The command is given as the leading rider approaches the first corner of a short side.

318. ACROSS THE CENTER, CHANGE HANDS: The command is executed when the leading rider next reaches the middle point of a long side.

319. AT WILL, CHANGE HANDS: Each rider changes hands at will by any one of the methods described, or by a countermarch.

320. ON THE CIRCLE: The section follows the leading rider onto the circle from the next **point of the circle.** The **points of the circle** are those points at which the large circle in the end of the school is tangent to the end quadrilateral, or, in the school described, to the half track. To put the section on two circles, the instructor designates a leading rider for the second

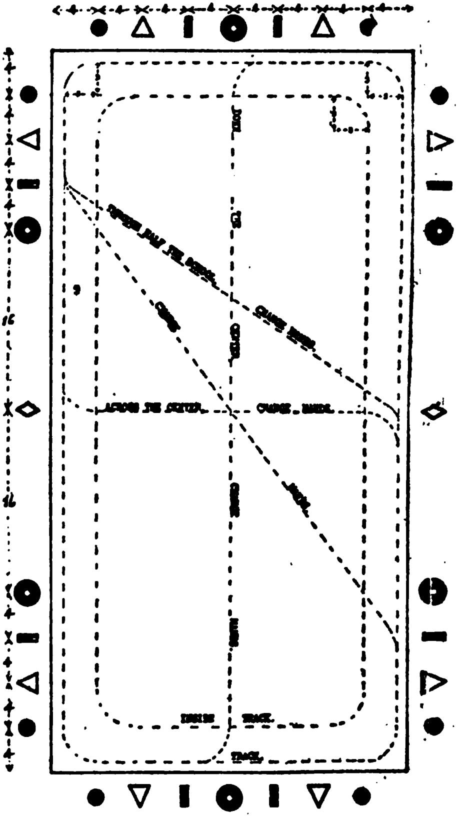


PLATE 3.—THE RIDING HALL.

circle and commands: ON TWO CIRCLES. This command is given after the leading rider has passed the center of a long side, and each leading rider then takes the circle at the next point of the circle.

To put the section again on the track: TAKE THE TRACK. The leading rider of the first circle [illegible] the track at the next point of the circle thereon. The leading rider of the second circle conducts his circle by the shortest [illegible] without change of cadence or gait, and joins onto the first circle at the proper distance.

To inscribe a circle the rider should have in mind a quadrilateral having its four corners in the four points of the circle. If the rider will then round out each one of these sides when riding from point to point he will use his [illegible] to better advantage and inscribe the circle more accurately than if he purposely tried to ride a circle.

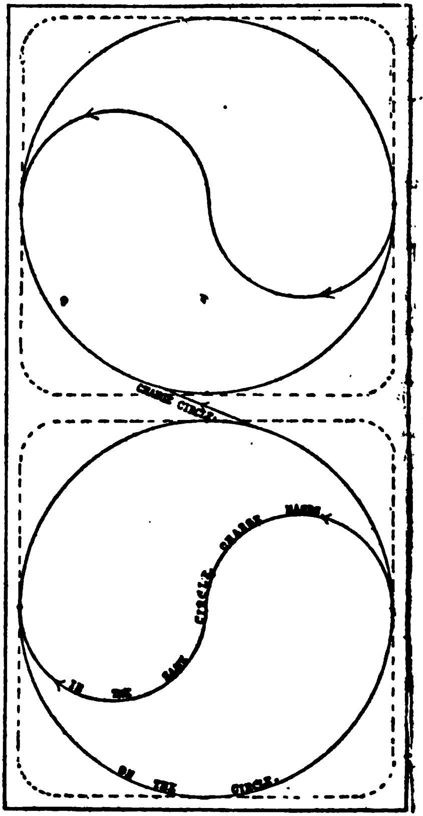
321. CHANGE CIRCLES: The leading rider just before reaching the point in the open section passes diagonally across to the circle in the other end of the school. [illegible] is also a change of hands. If the section is riding on two circles, the leaders give way to the left when changing from the left to the right hand and to the right when changing from the right to the left hand.

322. IN THE SAME CIRCLE CHANGE HANDS: The leading rider turns toward the center of the circle from the point just before the open side. The change of [illegible] is accomplished at the center of the circle.

323. Being on the circle, to diminish or enlarge the circle: DIMINISH THE CIRCLE, (TO (SO MANY) YARDS DISTANCE). DIMINISH THE CIRCLE: Each rider keeping his horse in the same cadence, individually diminishes the circle by riding a spiral toward the center of the circle until a distance of 1 yard or the prescribed distance has been obtained.

ENLARGE THE CIRCLE: Each rider individually enlarges the size of the circle by approaching the original arc of the circle on a spiral track, being careful to maintain the forward movement.

Each rider must enlarge or diminish the size of the circle individually and not follow the track of the leading or preceding rider. Each rider will therefore describe an individual spiral.


CHANGE CIRCLE.
CHANGE HANDS
IN THE SAME CIRCLE.
ON THE CIRCLE.

track toward the center of the circle or back to the circumference of the original circle, as the case may be.

324. Being on the track. **ALTERNATE TRACK AND CIRCLE:** The command is given when the leading rider approaches the second corner of a short side. At the next point of the circle the rider takes the track or the circle as he may elect. The following riders on reaching this point take either circle or track according to whether the preceding rider has taken track or circle. Those who take the circle make one complete round and repeat the exercise. The movement is continued until the command **TAKE THE TRACK.**

325. Being on the track. 1. **VOLT.** 2. **MARCH.** Each rider individually describes one complete circle tangent to the track, with a radius of 3 yards, and retakes the track at the point where he quitted it.

As the individual circle in a one-track movement, which represents the highest degree of curvature which is possible to require of the ordinary schooled horse without damage to gait or cadence, the instructor indicates a suitable larger radius when working with recruits or green horses, or when working at extended gaits. The marks on the walls of the school serve as guides to the men in describing their circles with the proper diameter.

Having counted three from front to rear, if the command be 1. **Nos. 1 2 or 3;** 2. **VOLT.** 3. **MARCH.** each No. 1 makes the volt and rejoins the column by taking the place vacated by the next No. 1 in his rear.

326. Being on the track to either hand. 1. **Countermarch.** 2. **MARCH.** At the command **march**, each rider leaves the track on the arc of a half circle, whose radius is 3 yards. From the outer point of the semicircle he executes an oblique back to the track.

The same precautions as to cadence and execution mentioned for the volt apply also to the countermarch.

If it is desired to execute the countermarch successfully from the head of the column, the instructor commands: 1. **By file,** 2. **From the corner.** 3. **COUNTERMARCH.** The leading rider on reaching the corner at the end of a long side turns through it, continues his turn to the half-circle point, and from there obliques back to and takes the inside track in the opposite direction.

827. Being on the track to either hand, **BROKEN LINE (SO MANY) TIMES**: The command is given when the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner or turn. In riding a broken line, the rider changes direction obliquely into the center of the school, and then back again to the track. While riding the length of the school he repeats this the number of times ordered in the command. The number of breaks ordered depends upon the length of the school and the stage of training of rider or horse. The length of each oblique depends upon the number of breaks ordered.

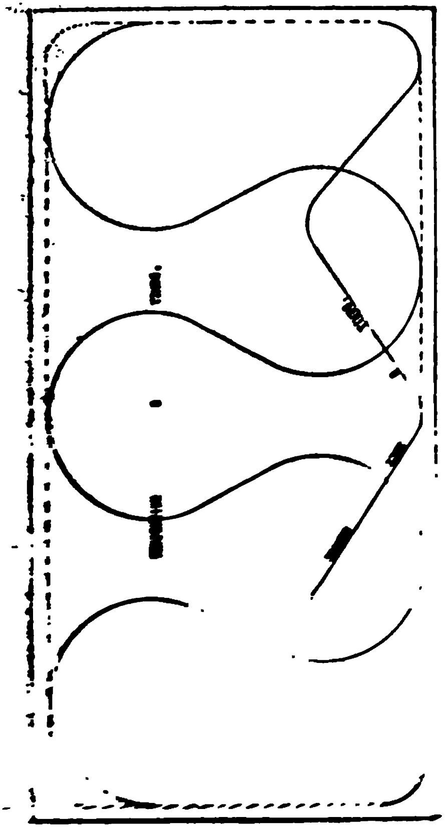
828. Being on the track to either hand, **SERPENTINE (SO MANY) TIMES**: The command is given as the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner. It consists of a series of incomplete circles or loops. It is of value in quieting horses and in teaching men the frequent change of aids to change direction. Each rider must be careful not to cut the curve but to ride it out fully.

829. ON THE FIGURE 8: The figure may be executed anywhere and may be of any size. It is always larger for untrained horses or riders. It is most accurately and easily made along a short side. It is begun after passing through the second corner of a short side, the first circle being described to the same hand as the rider's original direction. The second circle is described to the opposite hand.

The two loops should be perfect circles tangent at the common point opposite the center of the short side. This is the point at which the change of set or bend is made. Figure 8's are made during individual riding and at collected gaits only. The frequent change of bend in this movement makes it a capital lesson for both rider and horse.

Work by Threes.

830. Most of the riding-school exercises above prescribed can be executed in groups of three, either individually or col-



lectively. For example, being in column and counted off by threes from front to rear: 1. **Threes, right about,** 2. **MARCH.** Each No. 1 in the column, followed by his No. 2 and No. 3, executes a right about. If the command were: 1. **By threes, right about,** 2. **MARCH,** the leading Nos. 1, 2, and 3 would simultaneously execute an individual about. The next group of threes would advance to the same ground and execute the same movement, and so on throughout the column.

Other commands are: 1. **Threes, circle right (countermarch or column right),** 2. **MARCH;** and 1. **By threes, by the right flank (countermarch or right oblique),** 2. **MARCH.** The former indicates a successive execution by each man within his set of threes acting as a unit, all the sets of threes executing the movement simultaneously. The latter indicate a successive movement by each set of threes and a simultaneous execution by each member of a set as it arrives on the ground where the leading set began the movement.

881. Work by threes offers an excellent opportunity for variety and for keeping up the attention and keen spirit of a platoon. The variations are innumerable and depend upon the ingenuity of the instructor. Proficiency in this work arouses pride and a desire to excel. Moreover, smoothness and proficiency therein indicate the highest control of the horse and the proper use and application of the aids.

By forming threes abreast still greater intricacies may be introduced.

882. EXERCISE AT WILL: Riding-school work favors much practice at will (individual exercises prescribed by the instructor), in which the riders work independently of each other. The instructor watches special individuals and seeks to correct their faults. The riding hall, riding court, or rectangle serves only to indicate directions; each man practices as if he were alone, without regard to distance or alignment. Each should choose his ground so as to avoid interfering with his neighbors.

[illegible]

CHAPTER III.—THE DRIVER.

SECTION I.—RULES FOR DRIVERS.

MANAGEMENT OF DRAFT TEAMS.

333. Drivers of all animal-drawn vehicles are prohibited from leaving their teams standing unheld or untied.

Drivers must refrain from shouting or making threatening noises or motions around their teams.

Always gather a team before starting, changing direction or changing gait. This is done by tightening the reins and urging the animals into the bits.

Keep a steady pressure on the reins; never drive with reins lying loosely on the animals' backs.

See to it that the vehicle is well greased.

Vehicles in column should never be stopped when it can possibly be avoided. The adjustment of the load or the picking up of articles dropped off should be done without stopping, if at all possible. Stopping an entire column for any but a serious cause is inexcusable, and is a form of carelessness or willfulness that should be punished.

Drive at a steady gait; do not "back and fill"; gain lost distance gradually.

RULES OF THE ROAD.

334. Always be courteous; give plenty of room to others; remember that a smile or a pleasant laugh will do more than a growl or a surly remark.

When a vehicle is in column it is necessary to follow in trace, but be sure to drive where it is intended, and do not encroach upon the road or cut corners.

When alone, always drive on the right side of the road, and keep to the right when meeting vehicles.

On a narrow road a loaded team has the right of way, and it should be given ungrudgingly.

On overtaking a vehicle, pull out to the left and pass it at a steady pace without cracking the whip or coming in too close.

When followed by other vehicles, or when driving in a place where other vehicles are liable to be following, always signal before slackening the gait or changing direction. Signals are made by holding the hand or whip vertically for slackening and horizontally for turning.

When approaching a railroad crossing bring teams to a walk; a halt if necessary, but always look and listen.

Never halt upon a railroad track.

SECTION II.—HARNESS.

335. In garrison the harness is arranged on pegs on the heel posts of the stable as follows: Bridles hung on the peg by their headstalls; the traces, reins, and collars unlocked, hung on the peg close to the post; the pole yoke, with martingales attached, is hung from a spike driven into the side of the heel post.

In the field, cart harness is hung on the pole of the cart and covered with the paulin. Wagon harness is laid back on the footboard; reins, bridles, and collars on top.

TO HARNESS.

336. The instructor causes a cart team to be harnessed, points out and names the different parts of the harness, and explains their uses; he then causes the harness to be taken off and replaced on its peg.

337. The harness being on the heel posts, the instructor causes the men to stand to heel, and commands: **HARNESS**, when each man will place the harness upon the team in the following order and manner:

Collar: Each driver puts on and locks the collar of his right horse, then that of his left horse.

Traces; He lays the middle of the trace of the right horse over the horse's back, toggles on opposite sides, and, beginning with the right trace, passes the toggles through the loin loops from the rear and attaches them to the tugs on the collar. The traces of the left horse are then attached in the same manner. The rear ends of the traces are left hanging over the backs of the horses.

Bridle: He bridles the right horse and adjusts the reins, and then bridles the left horse and adjusts the reins.

Unless instructions to the contrary are given, the halters are removed before bridling.

Yoke: The driver takes down the yoke; places himself between his horses, facing in the same direction with them; fastens the breast strap of the right horse, then that of the left horse; passes the martingale of the left horse between the forelegs, through the standing loop on the cincha; attaches the hooks at the end of the side straps to the martingale D ring; secures the martingale of the right horse in the same manner; then passes out in rear of the left horse and stands to horse.

TO UNHARNESS.

338. The team being harnessed, the instructor commands: **UNHARNESS**, when the harness will be removed in the following order and manner:

Unyoke: The driver passes between his horses from the rear, unhooks the martingale of his left horse, and draws the martingale through the standing loop on the cincha; then does the same with respect to the right horse; unhooks the inside end of each breast strap, detaches the neck yoke and hangs it on its spike.

Bridle: He detaches the reins from the left horse, puts on the halter, fastens the halter strap to the manger, does the same with respect to the right horse and hangs the bridles and reins on the peg, the left bridle next to the post.

Traces: He disengages the left trace of the left horse and lays its middle over the horse's back, toggle on the left side; disengages the right trace and lays it beside the left trace, toggle on the right side; removes the traces and hangs them on their peg. In like manner he removes and hangs up the traces of the right horse.

Collar: He removes the collar of the left horse, then that of the right horse, and hangs them up, the left collar next to the post.

339. Harnessing and unharnessing in the field is executed as in garrison, with such modifications as the disposition of the harness requires. The horses are ordinarily tied by the halters to the wheels of the carts while harnessing and unharnessing.

FITTING HARNESS.

340. The cart harness is the artillery wheel harness, without saddles, and fitted with a back strap.

When the soldier has become somewhat familiar with the method of harnessing and unharnessing, he will be instructed in fitting harness, the importance of which will be thoroughly impressed upon him.

The **bridle** is fitted as prescribed in The Soldier Mounted.

341. The coupling reins: The correct adjustment of the two short inside reins, called coupling reins, requires great care. They should be so fitted that an even pressure is brought to bear on both sides of the animals' mouths, and in such a way also that both animals shall go straight and pull evenly on the traces. For instance, if the left horse carries his head to the left side, the coupling rein on the right side should be taken up, when his head will be straightened.

342. The collar: When adjusted, should freely admit the thickness of the hand between the lower part and the throat, and the fingers between the sides and the neck. A short collar chokes a horse by pressing on the windpipe; a narrow one pinches and rubs the neck. A broad collar works about and galls the shoulders.

343. The back strap: When adjusted, should admit the breadth of the hand between it and the horse's back.

344. The breech strap should be adjusted so that it will bear quickly when the horse is required to check the movement of the cart, but will not impede his movement while in draft. This adjustment is most important. It can best be made by observing the horse in draft and tightening the straps as much as can be done without impeding the free movement of the animal while in draft.

345. The hip straps should be of such length that the breech strap will bear just below the point of the buttocks. The lower the breech strap is adjusted the less does it assist the horse in checking the movement of the cart.

846. The loin straps should be so adjusted that the traces, when in draft, will be straight and without downward pull on the loops that support them.

847. The traces: The length of the traces must depend in a great measure on the size of the horse and his stride. The rule is to allow about 14 inches from singletree to hind quarters. The traces should be adjusted so that the line of traction will be straight from the singletree to the collars. This rule will regulate, in some measure, the length of the loin straps.

All trace chains have a ring at one end and a hook at the other; the hook is passed through the D ring at the end of the trace, and hooked back into any desired link. By this means the length of the trace is adjusted, and the trace chain need not be removed except for cleaning.

TO LEAD OUT.

848. The teams being harnessed, the instructor commands: **LEAD OUT.** The teams are led out directly and to the carts.

TO HITCH.

849. The instructor commands: **HITCH.** Each driver passes behind the left horse; places himself between his horses, on the left of the pole; engages the end of the pole in the pole-yoke ring; then goes behind the left horse and attaches his traces to the singletree, beginning with the right trace. He then passes around the front of his team at double time and hitches the right horse, beginning with the left trace.

He then mounts, if the section is mounted; if it is dismounted he stands as heretofore prescribed in paragraph 185.

TO UNHITCH.

850. The instructor commands: **UNHITCH.** Each driver dismounts, if mounted; detaches the traces of his right horse, and places the end of the traces over the horse's back, as prescribed for harnessing; passes around the front of his team at double time and unhitches his left horse in like manner; passes between his horses, disengages the pole from the pole-yoke ring, and lowers the pole to the ground.

TO DISMISS THE TEAMS.

351. The instructor commands: **LEAD IN.** The teams are then conducted to the stable or other designated place.

The instructor then commands: **UNHARNESS.**

The harness is removed, cleaned, and properly put in place; the horses rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed, and that all the precautions required on return from exercise have been observed, the instructor causes the harness to be covered, orders the men to **FALL IN**, marches them to the company parade ground, and dismisses them.

CARE OF HARNESS.

352. Breaks and rips in harness should be repaired without delay. Temporary repairs may be made by the driver, but he should take the harness to the saddler for permanent repairs as soon as possible.

Harness must be kept clean and in good condition no matter how often the conditions of weather require it to be worked on. At least once each week every harness should be given a general overhauling, parts separated, buckles and fastenings disengaged, and all leather and metal parts cleaned with harness soap and rubbed.

When leather shows signs of drying out it should be given a light coat of neatsfoot oil. The oil can be rubbed in on the rough side of the leather so as to discolor tan leather but slightly.

Leather must not be soaked with water. Just enough water is used with saddle soap to produce a lather. Leather may be cleaned with castile soap and then coated with the lather of saddle soap. Saddle-soap lather should be left on, and after about 15 minutes the leather rubbed with a dry cloth.

SECTION III.—DRIVING THE PAIR.

POSITION OF THE DRIVER.

353. The driver should sit firmly but comfortably in the seat, body erect without stiffness, and elbows close to the sides, with the points almost touching the hips.

He should not lean forward.

The wrist should be well bent, as this enables a steady pressure on the reins to be kept.

The forearms should be horizontal, and the fingers from 3 to 5 inches from the center of the body, with the knuckles to the front.

HOLDING THE REINS.

354. Place both reins in the left hand, the left rein over the fore finger, and the right rein under the middle finger. Thus you have two fingers between the reins. The reason for this is that it gives much more scope for play of the wrist on the mouths than if you only have one finger between the reins. The thumb should point straight to the front and should not be pressed down on the rein. The forefinger will be held well out, pointing to the right rear. This will keep the rein close to the knuckle, and the pair may be easily moved from side to side by simply turning the back of the hand up or down; up for left turn, and down for right turn.

The right hand is known as the whip hand and in addition to holding the whip is used to assist the left hand in shortening the reins by pulling them through from behind the rein hand.

HANDLING THE TEAM.

355. Bring the pair to attention by feeling their mouths gently and speak to them. If they do not respond, touch them gently with the whip.

The moment they start drop the hand slightly; "jibbing" is often caused by neglect of this precaution.

In all movements from a halt each driver gathers both of his horses just before they are to move; if in march and the gait or direction is changed, both horses are gathered just before they change the gait or direction. Care should be taken that both the horses move off together and change the gait at the same time.

In starting a cart or wagon it is especially important that both the horses of the team should throw their weights into the collars gradually but simultaneously. Unremitting attention is required upon the part of every driver in order that each horse shall at all times do its proper share of the work.

By observing these important rules a team is enabled to pull steadily together, and the horses are not fatigued by jerks, which make them balky, gall their shoulders, and break the harness.

In reducing the gait or in halting the movement must be checked gradually, so as not to bring undue strains upon the horses or the harness. Ordinarily about 2 yards should be gained in bringing a cart to a halt from a walk; in the exceptional cases, when carts are halted while moving at rapid gaits, from 5 to 10 yards should be gained in halting from a trot; from 10 to 15 in halting from a gallop.

The command for halting must be so given that the carts may be properly brought to rest at the place desired.

The gaits are always changed gradually, so as not to strain or worry the horses by sudden movements. In all cases, whether moving from a halt, changing gait, or halting, the horses should be made to act together, but they should always be handled quietly and kindly and allowed a sufficient time for their movements.

In executing the abouts and the turns at a trot or gallop the radius is sufficiently increased to permit the horses to execute the movement with ease, and in the abouts the gait is moderated to avoid overturning the carts.

Never hit an animal while the right hand is holding a rein, because if you try to cut him when you have the right rein in the right hand you must slack that rein off, and the pair is apt to dash to the left.

Do not get into the habit of "jabbing" the pair with the bits and do not flap the reins on their backs to start them or make them increase their pace.

Drive at a steady, even pace, as nothing tires a team so much as to constantly change the rate of speed.

When it is necessary to pull up in a hurry the proper course to pursue is to catch hold of the reins with the finger and thumb of the right hand, just behind the left, and shorten them as much as necessary by pulling them through. This is better than elevating the hands, which disturbs the seat.

The turn is made by moving the inside horse over a quarter circle whose radius is 4 yards, and causing the outside horse to quicken his movements so as to keep abreast of his team mate.

To back the team, the horses are reined straight backward, taking care to keep the pole straight. Upon reaching the proper position the reins should be quickly slackened.

SECTION IV.—DRIVING FOUR-IN-HAND.

POSITION OF THE DRIVER.

356. The body should be kept upright and square to the front, but all stiffness should be avoided. The ankles and knees should be just touching each other, and the arms close to the sides. The forearm should be about horizontal, and the left hand, as in driving a pair, from 4 to 5 inches from the center of the body, the back of the hand being turned toward the front, but inclined a little toward the team. The wrist should be bent slightly toward the body, and on no account allowed to bend the other way. This is far the best position for feeling the mouths, as the wrist then acts like a spring, and an even pressure can be maintained.

The driver should on no account be half standing, or merely leaning against the seat, with unbent knees, as, in the event of a wheeler falling or shying to the side, he will probably be jerked off the wagon.

THE REINS.

357. Hold the left lead over the left forefinger, the right lead between the forefinger and the middle finger, the left wheel between the same and under the right lead, and the right wheel between the middle and third finger. The reins must be gripped firmly by the three lower fingers of the left hand. The thumb should point to the right, and the forefinger be held well out. The left-lead rein should pass over or close to the knuckle of the forefinger and not over the first or second joint.

ADJUSTING THE REINS.

358. All four reins can be shortened, if much is required, by pulling them through from behind, but it is generally quicker and neater to hold the reins with right hand 2 or 3 inches in front of left (the little and third fingers over the right-side reins and the middle finger between the left-side reins), and then slide the left hand up to the right. This movement is generally required when going down hill.

WHEEL REINS.

359. Shorten these by pulling them through from behind. This is necessary when going down hill, especially when the wheelers are loosely poled up, so as to prevent the singletrees from hitting the leaders' hind legs.

LEFT-WHEEL REIN.

This is the most difficult rein to keep in its right place and to shorten. It is constantly slipping when the wheelers pull. It should be pulled through from behind.

RIGHT-WHEEL REIN.

Push it through from the front with the right hand.

LEAD REINS.

360. In order to shorten these take out both the leaders with the right hand (the third and little fingers over right, and first or middle finger over left-side rein); they then can be passed back to the left hand the required length by letting them slip through the right hand the necessary amount. To lengthen them, simply pull them through from the front.

LEFT-LEAD REIN.

Either push through from the front, with the full of the right hand over the rein, or take it right out of left hand and replace it the proper length.

RIGHT-LEAD REIN.

Push it through from the front.

THE WHIP.

361. The handle should rest in the palm of the right hand and be kept firmly in its place by the action of the thumb pressing against the base of the forefinger; the lower fingers will then be left free to catch hold of the reins.

If, however, it is necessary to pull the reins through from behind, the lower fingers must be tightened on the handle, so as to allow the thumb and forefinger to be used.

Hold the whip at an angle of about 30° to the left front and about 40° upward.

The thong should have three or four turns round the handle.

The point of the thong should be just under the inside of the thumb; this will keep it from slipping. Hold the whip where it will balance comfortably, the end of handle under the forearm, the wrist well bent, and the elbow close to the side.

362. When the right hand is on the reins or using the whip, it should be kept close to the left, the forearm being nearly horizontal. It can then rest on the thigh and yet be ready for any emergency.

363. The wheelers should be hit in front of the girth, to avoid making them kick. It is no use hitting the wheelers if the leaders' reins are too long. In this case you must first shorten up the wheelers' reins, and then use the whip on the leaders; otherwise, as soon as the wheelers have jumped into their collars, the leaders will again press forward and allow the wheelers to hang back as before.

364. The proper hitting of the leaders with the whip can only be acquired by practice when off the wagon.

HANDLING THE TEAM.

To Start.

365. Feel all the animals' mouths, and, if necessary, give them the word to go, dropping the hand to them at once until the vehicle is fairly off. The wheelers ought to start the wagon, and this can be effected by touching them with the whip, if they require it. It is never safe to start without having the whip in the right hand, ready for immediate use. The whip is to the driver what the leg is to the rider; that is, it keeps the team up to their bits. As soon as the team is going straight, take the right hand off the reins, at the same time keeping it close by, ready for any emergency.

Turning to the Left.

366. With the right hand seize the left-lead and wheel reins under the lower fingers; then either pull those reins up toward the center of the body, which will shorten them, or allow the left hand to go slightly to the front, which will slack off the right reins, or, better still, combine these motions.

Turning to the Right.

367. Take hold of the right-lead and wheel reins with the lower fingers of the right hand and treat them in the same way as in using the left reins.

To Steady the Team.

368. In order to steady the animals or to ease the left hand, the right may be placed in front of the other over all the four reins, the third and little fingers being over the right reins and the upper fingers over only one of the left reins.

Crossing the Road.

369. **To the left**: Turn the left hand, knuckles upward, and pass it across the body from left to right; the team will incline to the left, the reins on that side being shorter.

To the right: Pass the left hand down toward the left hip, back of the hand to the front, with the knuckles of the forefinger downward and that of the little finger uppermost. This shortens the right-hand reins and causes the team to in-

in that direction. The whip can be applied to the right wheeler in the first instance, or to the left one in the second, if they do not cross rapidly enough.

Pulling Up.

370. To pull up, shorten all the four reins by passing the left hand up to the right, or else by pulling all the four reins through from behind, as before explained; then, having the right fore finger on the left lead rein, the middle finger on the left wheel, and the lower fingers of the right hand on the right reins, pull both hands back toward the body, and if necessary lean back a little.

Should the team be getting the better of you, and you find that you can not stop it, it will be found a great assistance to place the right leg over all the four reins, as you may be able to stop them by the extra power and leverage by the position of the leg. Of course it is understood the brake has been applied.

Rules.

371. Always keep a steady pressure on the reins.

Never remove left hand from reins, even though the right may be holding them in front, as it is very difficult to get the left hand back into its place again with the reins in the right places.

Lead reins should seldom be removed from left hand.

Grip the reins tightly with third and little fingers to prevent their slipping.

Alter position of bits if the team pulls hard.

Always take a pull at the team to steady it just before you arrive at the crest of a hill, and begin to descend slowly, holding the leaders steady, and with just enough traction to keep their singletrees from hitting them.

In crossing ruts and in turning corners be careful that the leaders are out of draft; otherwise the pole may be snapped off or the wheelers pulled down.

If, while going down a hill, and especially when near the bottom, you find a wheeler slipping on his hocks, do not try to pull him up, but drop the hand and allow the team to go a trifle faster.

CHAPTER IV.—THE PACKER.

SECTION I.—OBJECT OF INSTRUCTION.

372. The object of this instruction is the detailed training of individual packers in harnessing and unharnessing and in fitting and properly cleaning and caring for harness, and in managing and maneuvering the different mules of a section.

SECTION II.—THE APAREJO PACKSADDLE.

DESCRIPTION.

373. The aparejo packsaddle consists of the aparejo proper and the detachable frame. The aparejo proper consists of two panels of leather, each braced with light ribs held in place by a boot stick at the bottom and a saddle bar at the top of the panel; the panels are filled with hay, each saddle being fitted to its mule. Over the panels is the sobrejalma of canvas, leather faced, the ends of which are protected by wooden shoes held in place by leather caps. The sobrejalma is secured to the aparejo by thongs at the ends of its center line. To the panels is laced the crupper. The cincha is of canvas, doubled, with a leather cincha strap laced to it at one end, which is faced with leather and braced with an iron rod. This strap, at its attachment to the cincha, carries a rendering ring through which it passes in tightening. Fifteen inches from this end of the cincha a leather thong, the finger loop, is attached, which is used to secure the end of the cincha strap after cinching. The other end of the cincha carries a curved piece of pipe which takes the place of a cincha ring. The cincha should be 8 inches longer than the aparejo with which it is used.

374. The frame consists of metal arches and side bars, riveted to spring-steel side plates for distributing the pressure on the saddle, and has suitable attachments for supporting the pack chests, sections of mast, and generator.

375. Each aparejo is provided with a corona, or pad, made of several thicknesses of blanket, lined with canvas; also a saddle blanket.

TO SET UP THE APAREJO.

376. To rib up: Unlace the slits and handholes; soak the aparejo in tepid water for about 15 minutes, drain it and lay it flat, back pieces up; insert the boot stick and the saddle bar through the slit in rear and press them to their places at the boot and the center stitch line, slotted sides up; insert the numbered set of nine ribs through the slit in rear in their numerical order and seat them in that order from collar to rear in the slots of the boot stick and saddle bar, butts at the boot; secure the top of each rib as it is seated by inserting the key bar at the front edge below the collar and passing it over the rib in place; fasten the key bar to the collar by the thong.

NOTE.—Aparejos are issued to the service with ribs in place. Ribs are furnished in sets of nine. Each rib is numbered at its butt to correspond to its proper numerical position in the panel, counting from the collar to the rear. Each rib is also stamped with the size of the aparejo for which it is made. The aparejos are furnished in 58, 60, and 62 inch sizes. The ribs for a 60-inch aparejo are therefore marked "1–60," "2–60," "3–60," etc. Should repairs or alterations make it necessary to rib up, the butt of the fifth rib is seated in its slot, the overlap at its slot in the saddle bar is marked and cut away, and the other ribs are cut to the exact resulting length.

Guava, willow, dogwood, hickory, or any other wood combining the qualities of permanent elasticity and strength may be used to replace broken ribs.

377. To fill or pad: Turn the aparejo over, belly pieces up; procure about 6 pounds of long, fine, soft, elastic hay; taking a little at a time, tease or "mix" it thoroughly, insert it through the handhole and thus gradually fill the body of the aparejo with a smooth and even layer, not more than 2 inches thick.

NOTE.—Other filling may be used in necessity, such as moss, excelsior, curled hair, sea grass, but these substitutes are difficult of manipulation in alterations necessary to accommodate the rigging to injuries of the mule. By teasing or "mixing" is meant the arrangement of the straws so that they will cross one another. The body of an aparejo is that part which comes in contact with the body of the mule. As 3 inches of the lower portion of each boot stick and 3 inches of the upper portion of each saddle bar must not come in contact with the mule, no filling should be pressed under the boot stick or within 3 inches of the center stitch line. The body course tapers, however, so as to overlap the boot stick and saddle bar, and also tapers toward front and rear.

378. To face up or dress: To adjust the aparejo more accurately to the shape of the mule, introduce filling and press it well into the corner of the front boot; working toward the handhole, continue the facing along the boot stick and front edge, gradually increasing its thickness to about an inch at 7 inches from the corner and forming its inner edge into the arc of a circle concentric with the handhole, the thickness tapering to the ends of the arc; continue the facing for 3 inches more toward the handhole, rapidly decreasing the thickness to nothing; proceed in exactly the same way at the collar. Under no circumstances should the collar facings reach within 7 inches of the center of the handhole. Connect the front boot and collar facings by a dressing along the front edge about 3 inches wide and an inch thick, decreasing in thickness toward the handhole and toward the middle of the edge.

379. Rib up, fill, and dress the other panel in the same manner.

NOTE.—In facing up, introduce the filling with the hand, palm up, so as not to disturb the body course. In case the leather will not yield enough to permit the filling to be introduced well into the corners, the tamping stick may be used to raise it. This stick, used with the commercial aparejo, is 4 or 5 feet long. 1¼ inches in diameter, wedge shaped for 4 inches from one end, the edge of the wedge being about one-fourth inch thick and grooved. The object of the boot facing is to cause the boot stick to carry horizontally and parallel to the center line of the mule and give free action to the mule's elbow.

Mules of large barrel will require a thicker facing than that described. The object of the collar facing is to cause the saddle bar to carry horizontally and parallel with the center line of the mule and to protect the mule's withers. Mules with high withers will require a thicker facing than that described. In setting to the shape of the mule the aparejo bends at the middle of the front edge. It is important that the body course remain undisturbed during dressing and that the instructions given be carefully followed to avoid sore withers and tails and body and belly bunches.

380. To attach the crupper: Stand the aparejo on its boot in its normal position; secure a lance thong to the front hole on the upper facing of the crupper on each side and fasten the crupper with short thongs to the center holes of the carrier pieces on the rear of the aparejo; pass the crupper lace thong through the second hole from the top of the front facing of the aparejo, through the second hole of the crupper, through the third hole of the aparejo facing, through the fourth hole of the crupper, and so on, finishing through bottom holes of facing and crupper and tying to the crupper hole.

NOTE.—In lacing the crupper to the aparejo, the thong must be passed through the holes from the outside and must not be twisted, the lacing must not cross, and it is important that the tie be made on the last hole of the crupper instead of the aparejo.

381. To assemble the saddle: Place the sobrejalma on the aparejo so that its staple holes fit over the staples on the latter; seat the frame and pass the straps on the sobrejalma through the staples; pass the cincha through the frame over the side bars, finger loop up and cincha to the left; double the cincha over the frame, strap inside; double the crupper forward so that the dock piece rests on the cincha.

REMARKS ON THE PACK SADDLE.

382. When the set-up aparejo is to be filled, no soaking is necessary; instead, make the belly pieces pliable by rubbing with a wet sponge.

Mules weighing 850 to 900 pounds require a 58-inch aparejo; 1,000 pounds, 60-inch; 1,100 pounds, 62-inch; for heavier mules larger sizes are necessary.

When the mule is loaded the cincha, in travel, should free the elbow by about an inch; more than this will prevent a proper grip on the belly.

If the boots ride high on the body of the mule, or if they reach under the belly, even though they ride horizontally and parallel to the center line of the mule, the aparejo will be likely to turn easily. This fault encourages injuriously tight cinching.

If one or both boots flare out or turn in toward the mule, cinch sores and sore tails result, or belly and body bunches are caused.

The width of the collar arch clearance should be at least 5½ inches. If it is too narrow or too wide, or if the saddle bars slope downward toward the front, there will be sores on the withers; if they slope to the rear there will be injuries over the loins, called kidney sores.

If the lacing of the crupper is drawn too tight at the bottom the lower edge of the crupper will rub the buttocks and cause abrasions.

The object to be attained is the uniform distribution of the weight of the load over that portion of the mule's body anatomically suited to carrying a burden so that the saddle will ride with little motion and without friction of the bearing surface of the body. The contact of the bearing surface of the saddle must be close at all points. As the mule's body swells from front to rear, the more or less cylindrical shape of the aparejo after the body course is laid must be modified by facing up so as to provide a concave surface to fit over a convex surface. But as the barrel of the properly conformed mule is nearly cylindrical through the rear half or more of the contact surface, no facing is necessary, as a rule, in the rear part of the aparejo, although conformation may require it exceptionally.

SECTION III.—HARNESSING.

TO FOLD THE BLANKET.

383. Hold the blanket by the corners, the short edge up and down. Bring the short edges together, the right hand holding the corners, the left holding the folded edge at the top. Shake

the blanket and spread it on the ground, the han
the corners. Carry the upper edge to the front
a portion of the blanket 22 inches wide on the
fold back so as to leave the blanket in three
inches wide and 42 inches long. Shake well
more, bringing the ends together, and place acr

BLINDING THE MULE.

384. A pack mule is ordinarily blinded d
and unharnessing, loading and unloading. To
move when blinded, the blind must always be
quiring it to change position.

TO HARNESS.

385. Two packers are assigned to each
trained mule is assigned to two men. E
supervised by a thoroughly instructed ma
causes a mule to be harnessed and point
different parts of the pack outfit and exp
then has the harness taken off and placed

386. The pack outfit being in rear of th
causes the men to stand to heel and com
which the harness is placed upon the
order:

Blind: The packer of the mule being
side, takes hold of the halter with the
edge of the blind near one end with the
over the mule's neck to the right side,
blind well to the front over the mule's
the eyes, the tail on top of the neck.

Bridle: The packer of the mule bein
side, passes th
the wa
hand

HARNESS.

harness should be exposed to
d should be cleaned whenever
on them or when they have be-
of the animal. The parts should
with a lather of castile soap and
then be rubbed nearly dry and a
arm water should be applied. Ex-
er should be permitted to evaporate
ument frequently applied is suffi-
as become harsh and dry, its dressed
ed with neatsfoot oil after the castile
before the Crown soap lather is ap-
surplus oil. Polishing of the leather
itted, as it leads to the surreptitious
als that are often detrimental to the

exposure to the sun, by water, and by
wn soap or of common commercial soaps.
is clean, soft, smooth, pliable, and free

he harness is removed from the animal,
be scraped free from all adhering sub-
t smooth-edged knife. Especially constant
ven to the cleanliness and pliability of the
orona and crupper and to the dock piece.
hair cinchas should be rubbed between the
nd beater with switches or wands to remove
rs and to make them soft and pliable. They
frequently to the sun, completely unfolded,
d be occasionally washed in tepid water.
ust be kept free from rust, dirt, sweat, and
ed with coats of paint or lacquer are to be
at condition. Bright parts should be polished.
lers, and keepers of buckles must work freely,
straps must be unbuckled in cleaning.

of the other part; places the palm of his right hand against the rear end of the boot, pulls the strap taut with his left hand, and calls **set**. At this the right packer passes in rear and observes whether the aparejo is straight. If not, it is correctly adjusted. He then takes hold of the cincha strap between the left packer and the mule, the palm of the right hand up, that of the left hand down, and places his right knee against the boot. The left packer raises his left foot to the boot and both pull together until the cincha eye is at the edge of the boot, the cincha in the center of the aparejo. The left packer holds the cincha strap with his left hand below his right, and passes the finger loop from above and back into the right hand of the left packer, who secures it. The packer of the harnessed mule removes the blind and places it on his left shoulder with the tail under the right arm.

TO UNHARNESS.

387. The instructor commands **UNHARNESS**, at which the packers unharness in the following order:

Saddle: The packer on the left side unfastens the cincha strap and throws its end across the aparejo; folds the cincha with the strap inside and places it on top of the frame. Both packers push the aparejo slightly to the rear. The left packer places his left hand on the upper edge of the crupper, his right on the lower edge near the dock piece; the right packer takes a corresponding position; both together raise the crupper and reverse it forward over the cincha; take hold of the aparejo as in saddling, pass it backward over the mule, and lower it carefully to its place in rear.

Blanket: The packer on the left side grasps the front and rear edges of the blanket at their middle points, removes it, allows it to fall into a fold between his hands, places it along the left side of the corona, grasps the corona at the middle points of its front and rear edges, removes it, and places both on the aparejo.

Bridle: The packer of the mule being unharnessed removes the watering bridle in the reverse order of bridling and places it and the blind on the corona.

388. All men are instructed in the duties of both left and right packers.

CARE OF THE HARNESS.

889. The leather parts of the harness should be exposed to the sun as little as possible and should be cleaned whenever dirt, grit, or dust has collected on them or when they have become saturated with the sweat of the animal. The parts should be separated and each sponged with a lather of castile soap and warm water. They should then be rubbed nearly dry and a lather of Crown soap and warm water should be applied. Excess of moisture in this lather should be permitted to evaporate in a shaded place. This treatment frequently applied is sufficient, but if the leather has become harsh and dry, its dressed side should be lightly coated with neatsfoot oil after the castile lather and allowed to dry before the Crown soap lather is applied, the latter removing surplus oil. Polishing of the leather parts should not be permitted, as it leads to the surreptitious use of commercial materials that are often detrimental to the life of the leather.

Leather is injured by exposure to the sun, by water, and by the use of too much Crown soap or of common commercial soaps. In proper condition it is clean, soft, smooth, pliable, and free from stains.

Immediately after the harness is removed from the animal, canvas parts should be scraped free from all adhering substances with a dull but smooth-edged knife. Especially constant attention must be given to the cleanliness and pliability of the canvas side of the corona and crupper and to the dock piece.

Woolen parts and hair cinchas should be rubbed between the hands or hung up and beater with switches or wands to remove dust, mud, and hairs and to make them soft and pliable. They should be exposed frequently to the sun, completely unfolded, and blankets should be occasionally washed in tepid water.

Metal parts must be kept free from rust, dirt, sweat, and hair. Those issued with coats of paint or lacquer are to be maintained in that condition. Bright parts should be polished. The tongues, rollers, and keepers of buckles must work freely, to which end the straps must be unbuckled in cleaning.

SECTION IV.—MANAGEMENT OF THE PACK MULE.

TO GATHER THE MULE.

890. The packer raises his right hand to attract the attention of the mule, collect him, and prepare him to move.

HANDLING THE MULE.

891. The led pack mule is managed by the leading reins or halter. By quiet and gentle treatment he must be taught to work and to effect changes of gait and direction evenly. He should not be turned short, but on the arc of a circle of 1 yard radius. He should be led with a loose rein, urged on, if he lags, by the driver in rear. He should not be threatened by his driver. The mule must always be gathered before moving from a halt, before halting, and before changing gait or direction.

SECTION V.—TO DISMISS THE PACKER.

892. The instructor may conduct the packers in column into the stable and halt the column so that each driver is opposite his stall; or he may first form the drivers in line in the vicinity of the stable or park, and command: 1. **By the right (left)**, 2. **FILE OFF.** In the latter case the packers file off in succession, as explained in The Soldier Mounted, and halt when opposite their stalls or the place designated for unharnessing.

893. The instructor commands: **UNHARNESS.**

The harness is removed, cleaned, and properly put in place; the mules rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed and that all the precautions required on return from exercise have been observed, the instructor causes the harness to be covered, orders the men to fall in, marches them to the company parade ground, and dismisses them.

894. The mules assigned to the transportation of a pack radio set are designated respectively (1) generator mule, (2) chest mule, (3) kit mule.

Pack mules also carry the wire laid by the sections of the outpost company.

PART IV.

FIELD SIGNAL TROOPS.

CHAPTER I.—OBJECT AND COMPOSITION.

395. Field signal troops comprise those Signal Corps units permanently assigned to divisions, army corps, and armies for the purposes of establishing and maintaining tactical lines of information and for transmitting over these lines such information as is incident to operations in the field.

396. The basis of organization for field signal troops is the field battalion, which is composed of a headquarters and a supply detachment, a wire company, a radio company, and an outpost company.

One field battalion is assigned to each division, one to each army corps, and such number as necessary to each army.

397. Field signal troops assigned to a division are used only in the presence of an enemy, real or assumed. Their use in the handling of routine and administrative matters or for the convenience of the personnel of the division is unauthorized except in so far as these are related to existing tactical situations.

398. Field signal troops assigned to army corps and armies are intended to furnish a reserve for the field battalions in advance, to supplement the work of the latter when necessary or desirable, and for use with separate brigades and expeditionary forces. In emergency, these troops may assist telegraph troops in establishing and maintaining the necessary strategical lines of information.

399. The normal use of field signal troops is to establish, maintain, and operate tactical lines of information within the division, and such is the use which will be dealt with hereinafter. Field signal troops assigned to army corps and armies normally constitute a reserve and, except for the use of wagon radio sets for communicating with divisions, their active employment otherwise is to be regarded as exceptional.

CHAPTER II.—THE WIRE COMPANY.

SECTION I.—GENERAL.

FUNCTION AND EMPLOYMENT.

400. The wire company is the field signal organization used by the commander of a division for establishing and maintaining those tactical lines of information which radiate from division headquarters, and which serve, in general, to connect these headquarters with the major subordinate units. Normally the wire company is used to connect division headquarters with the headquarters of the various brigades within the division, with the divisional artillery, and, in some cases, with the divisional trains. Opportunity for its use in maintaining communication with the divisional cavalry will occur so rarely that its employment in this manner is prohibited except in emergency.

ORGANIZATION.

401. The wire company is organized into the necessary headquarters and company staff and two platoons of two wire sections each.

For drill the company is formed as above. In the field or on the march the company instrument wagon and the two reserve wire carts form a third platoon under command of the supply sergeant.

402. The organization, in detail, is as follows:

1 captain.
2 first lieutenants.
1 master signal electrician.
1 first sergeant (sergeant, first class).
1 supply sergeant (sergeant).
1 stable sergeant (sergeant).
1 mess sergeant (sergeant).
1 horseshoer.
1 clerk (corporal).
2 cooks.
1 farrier (corporal).
1 saddler (corporal).
1 mechanic (corporal).
1 assistant mechanic (private, first class).
3 drivers (privates, first class).
1 guidon (private, first class).
2 buglers (privates, first class).
4 wire sections.

DUTIES OF INDIVIDUALS.

408. The captain commands the company and is responsible for its training and efficiency.

The lieutenants command platoons, and will be assigned to such other duties as the captain may deem necessary.

The master signal electrician is responsible to the captain for the condition of the technical equipment of the company. To this end he will make frequent and regular inspections of same and, when parts of the technical equipment are found or reported unserviceable, will make or supervise the necessary adjustments or repairs. Under the direction of the captain, he will order such precautionary and corrective measures as he may deem advisable concerning the care and repair of technical equipment. Master signal electricians also act as substitute chiefs of platoons.

The first sergeant is the assistant of the captain, and is responsible to him for the general good order, police, and discipline of the company. In action he remains with the captain and under his immediate orders.

The supply sergeant is responsible to the captain for the care and preservation of the matériel not issued to the sections.

The stable sergeant is responsible to the captain for the general care of the public animals assigned to the company, the good order and police of the stables and picket lines, and the conduct of the stable personnel, when on duty.

The mess sergeant is responsible to the captain for the efficient and economical handling of the ration, for the conduct of the kitchen personnel when on duty and for the cleanliness of the company kitchen and surroundings.

The mechanics, under the orders of the supply sergeant, are responsible for the repair of the matériel pertaining to the company.

Chiefs of sections command the sections and will be held responsible to the captain for the condition of their equipment and the training and efficiency of their sections. They will make, or cause to be made, such minor adjustments or repairs to technical equipment as can be effected by the personnel of the section, promptly reporting more serious deficiencies to the master signal electrician.

The drivers are directly responsible to their chiefs of sections for their animals, harness, and equipment. They will report at once to their chief of section any injury to animals or matériel.

Drivers of combat vehicles not assigned to sections are likewise responsible to the supply sergeant.

The operators are responsible for the serviceable condition of their instruments and will report at once to their chiefs of sections any need of repairs.

The linemen are responsible for maintaining the section lines intact. They will carry the necessary equipment, and will report to the chief of section at once if their matériel is not in their possession or is unserviceable.

Messengers are responsible for the delivery of all messages, no matter what the conditions.

SECTION II.—THE WIRE SECTION.

COMPOSITION.

404. The wire section is normally composed of 13 mounted men and a wire cart and its driver.

The organization, in detail, is as follows:

1 section chief (sergeant, first class).
1 driver (private, first class).
3 station squads, each consisting of:
    1 lineman
    1 messenger
    1 horse holder
    1 operator
    } assigned by section chief from sergeant, corporal, private, first class, or private according to qualifications.
        Total, 14.

FORMATION.

405. The mounted men of the section are formed in column of fours, as prescribed in The Soldier Mounted, the cart horses 2 yards in rear of the mounted men, and in such a position that the pole of the cart is in prolongation of the interval between the numbers 2 and 3 in the mounted ranks.

POSTS AND DUTIES OF INDIVIDUALS

406. The chief of section is on the left of the leading four, two or file; except that when the section is acting alone he may go where his services are most needed.

Each four constitutes a station squad and includes the personnel necessary to establish and operate one buzzer station. Each four is formed from right to left as follows: No. 1, the lineman; No. 2, the messenger; No. 3, the horse holder; No. 4, the operator.

Where practicable, noncommissioned officers, except the chief of section, should be assigned to duty as operators.

DRILL OF THE SECTION.

The Guide.

407. The guide of the section is the chief of section. In the absence of the chief of section the left man of the leading rank is the guide.

To March to the Front.

408. 1. **Forward**, 2. **MARCH.**

Executed as prescribed in paragraph **285**, substituting "section" for "squad." The cart maintains its position 2 yards in rear of the mounted men.

To Halt.

409. 1. **Section**, 2. **HALT.**

Executed by all individuals stopping simultaneously.

To Change Direction.

410. 1. **Column right (left)**, 2. **MARCH.**

The section remaining in column of fours, the fours successively execute **RIGHT TURN** as prescribed in paragraph **290.** The cart maintains its position 2 yards in rear of the mounted men.

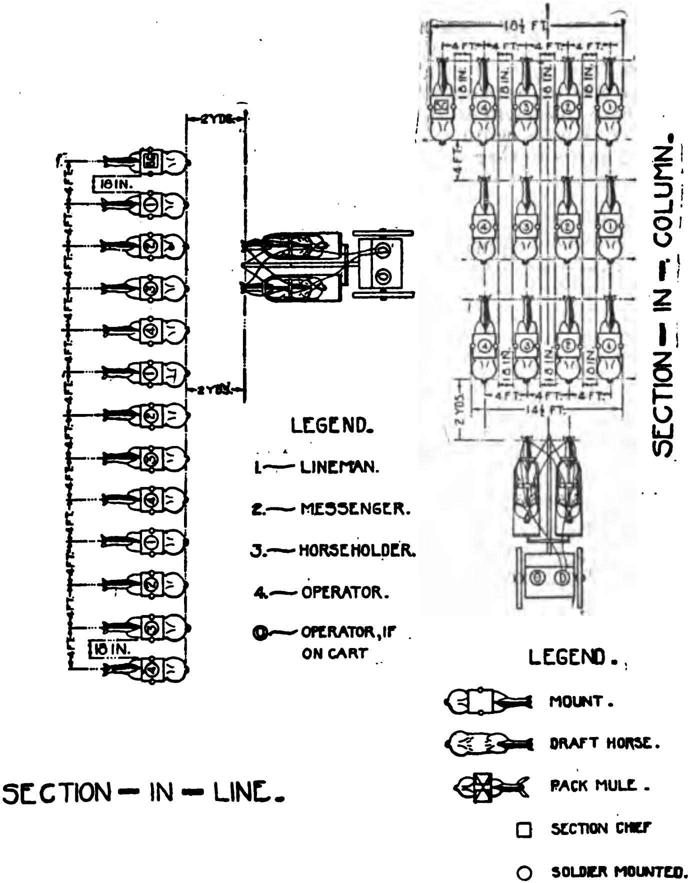


PLATE 4.—THE WIRE SECTION.

To March to the Rear.

411. 1. **Right (left) about,** 2. **MARCH.**

The section, remaining in column of fours, moves to the right and rear, the right man in the leading rank marching over half a circle whose radius is 2 yards. The cart maintains its position 2 yards in rear of the mounted men.

To March Obliquely.

412. 1. **Column half right (left),** 2. **MARCH.**

Executed as prescribed for changing direction except that fours successively make a half turn to the right.

To make a slight change of direction: **INCLINE TO THE RIGHT (LEFT).**

Executed as in paragraph **286.**

To Form the Mounted Men of the Section into Line.

413. 1. **Left front into line,** 2. **MARCH.**

The chief of section places himself on the right of the leading four.

Executed by the mounted men as prescribed in paragraph **295.**

The cart closes up to 2 yards in rear of the right four.

This movement will always be executed to the left.

Rule 1, paragraph **434**, governs the gaits, substituting "four" for "section."

To Re-form the Section in the Normal Formation.

414. 1. **Right by fours,** 2. **MARCH.**

The right four moves straight to the front; the other fours successively oblique to the right front when disengaged so as to follow the leading four at the proper distance.

The chief of section takes post on the left of the leading four.

The cart follows the rear four at 2 yards distance.

Rule 2, paragraph **434**, governs the gaits, substituting "four" for "section."

To Form the Mounted Men in Column of Twos or Files.

415. 1. **By twos (files),** 2. **MARCH.**

Executed by the mounted men as indicated in paragraphs **296** and **297.**

The cart follows the column of twos or files at 2 yards distance.

Rule 2, paragraph **434**, governs the gaits, substituting "two" or "file" for "section."

To Re-form the Mounted Men in Column of Fours.

416. 1. **Form fours,** 2. **MARCH.**

Executed by the mounted men as indicated in paragraphs **298** and **299**

The cart follows the rear four at 2 yards distance.

Rule 1, paragraph **434**, governs the gaits, substituting "two" or "file" for "section."

To Open Station.

417. To open station and move to the front from a halt: **OPEN STATION.** At this command the linemen of the first and second fours, the messenger of the first four, and the chief of section turn out of the column, to the right, the horse holder and operator of the first four turn out of the column to the left. The two linemen, remaining mounted, prepare to follow the reel cart and lay out the wire, the lineman of the second four starting off in front.

The remaining men of the first four all move to the rear of the cart and dismount, except the horse holder, to whom the horses are turned over. The messenger unties the wire from the cart and pulls off enough slack and holds it or makes it fast to some convenient anchor. The operator prepares his buzzer, connectors, and ground rod, and opens the station in the location indicated.

When it becomes necessary for the lineman of the second four to stop for the purpose of making a tie, or for other reasons, he is passed or "leap frogged" by the lineman of the first four. This practice obtains whenever two linemen are working together, linemen using the "leap frog" method to the best advantage.

Laying the Wire.

418. When the end of the wire has been removed from the cart the chief of section, or, in his absence, the senior present, at a signal from messenger, commands: **DRIVE ON**, at which command the cart, preceded by the men of the second and third fours, except the lineman of the second four, moves out over the indicated route, at first slowly, in order not to break the wire. The two linemen follow the cart attending the wire until the second station is opened, when the lineman of the first four returns back over the line to his station. His place is taken on the line work by the lineman of the second four, who is replaced by the lineman of the third four.

The manipulation of the machinery of the wire cart for handling the wire will be a part of the duty of the cart driver, unless an operator be placed on the cart, in which case the latter may handle the clutch. The reel must always be stopped before a march to the rear is taken up.

419. The chief of section rides near the cart, or wherever necessary in order to properly supervise the laying of the line. He will also designate a scout to precede the section from 100 to 200 yards and select a route in the immediate front for the cart to follow. The driver will conform to the signals of the scout. If the section is in march, it is halted before giving the command for opening station. As each station is established the operator will call up the initial station.

To Close Station.

420. 1. **CLOSE STATION.** At this command the lineman of the distant station immediately starts back over the line, laying out the wire in a convenient place for recovery. The operator of the distant station calls up all stations on his line, sends G. B., and signs his station call, cuts out his buzzer, and mounts. The horse holder now mounts and prepares to attend the loop, using the spare pike which is lashed to the pole of the wire cart. The messenger takes the hand guard from the cart and feeds the wire upon the reel.

Recovering the Wire.

421. 1. REEL UP.

At this command the wire cart moves off back over the line, reeling up the wire. As the loop approaches the cart the man attending it will call out **clutch**, when the driver will throw out the clutch in order to allow the loop to drop back.

422. Intermediate stations are closed by the command **close station**, and when the cart approaches the members of these stations take charge of the work of recovering the line back to the next station.

Members of the section not engaged in laying out or recovering the line ride in front of the cart. This rule is general.

As the cart approaches the end of the line an increased gait will be taken to gain sufficient momentum to reel up the slack. When all the wire is on the reel the section is re-formed in its proper place.

SECTION III.—THE WIRE PLATOON.

COMPOSITION.

423. The wire platoon is composed of two wire sections and is commanded by a lieutenant.

FORMATION.

424. The habitual formations of the platoon are the **order in section column** and the **order in line**.

The **order in section column** is that in which the sections of the platoon follow each other in the order, or the reverse order, of their numbers from front to rear. The distance between sections is 2 yards.

The **order in line** is that in which the sections of the platoon are formed abreast of each other in the order, or the reverse order, of their numbers from right to left. The interval between the sections is that which would result from the sections moving from the order in section column by the flank. This interval is approximately 16 yards.

POSTS AND DUTIES OF INDIVIDUALS.

425. In the order in section column the post of the lieutenant is 4 yards opposite the center of the platoon, on the left when the first section of the platoon is leading and on the right when the column is reversed. In the order in line his post is midway between the two sections and in line with the leading fours of the platoon. When acting as an instructor he goes where his presence is necessary.

The lieutenant commands the platoon. The posts and duties of enlisted men in the platoon are prescribed in Section II above.

DRILL OF THE PLATOON.

426. The platoon is drilled in accordance with the principles and by the methods and means prescribed for the section and the company.

The captain may assign to platoons, for purposes of drill and instruction, such members of the company staff as he may deem advisable.

SECTION IV.—THE COMPANY.

FORMATION OF THE COMPANY.

427. The habitual formations are: **The order in section column, the order in line,** and **the order in platoon column.**

428. **The order in section column** is that in which the sections of the company follow each other in the order, or the reverse order, of their numbers, from front to rear. The distance between the mounted men and carts in a section, between sections and between platoons is 2 yards.

The order in line is that in which the sections of the company are formed abreast of each other in the order, or the reverse order, of their numbers from right to left. The interval between the sections and between platoons is that which would result from the sections moving from the order in section column by the flank.

The order in platoon column is that in which the platoons of the company, each in the order in line, follow each other in the order, or the reverse order, of their numbers from front to rear. The distance between the platoons is that which would result from wheeling the platoons from the order in line to the order in platoon column.

POSTS OF INDIVIDUALS.

429. In the order in line:

Captain, 8 yards in front of the center of the company.

Chiefs of platoons, as in the wire platoon in the order in line.

Master signal electrician, 4 yards in rear of the center of the second platoon. The master signal electrician and first sergeant establish the line of file closers.

First sergeants, 4 yards in rear of the center of the first platoon.

Chiefs of sections, as prescribed in The Section.

Guidon, abreast of the front rank of the company and 2 yards from the flank toward which the guide has been announced.

Buglers, in line, 2 yards in rear of the captain.

Other members of the company staff when present mounted, posted in the line of file closers in order of rank from position of the first sergeant to that of the master signal electrician. They conform to the movements of the above noncommissioned officers.

430. In order in section column:

Captain, opposite the center of the column and 16 yards from the flank; on the left when the first section leads and on the right when the column is reversed.

Chiefs of platoons, 4 yards from the center of their respective platoons and on the same side as the captain.

Master signal electrician, 4 yards from the center of the second platoon and on the flank opposite the captain.

First sergeant, 4 yards from the center of the first platoon and on the flank opposite the captain.

Chiefs of sections, as prescribed in The Section.

Guidon, abreast of and 2 yards to the right of the leading section.

Buglers, as in the order in line.

481. In the order in platoon column:

Captain, except at ceremonies, 16 yards from the center of the company and on the side of the guide. At ceremonies as in the order in line.

Chief of platoons, master signal electrician, first sergeant, chiefs of sections, guidon and buglers, as in the order in line.

DRILL OF THE COMPANY.

The Guide.

482. Chiefs of sections supervise the gait and direction of march of their sections. In section column, the guide of the leading section is the guide of the company.

The guide of the company or platoon in line is the guide of the right or left section.

During an oblique march the guide of the company is, without indication, the guide of the leading section on the side to which the oblique is made.

The guidon always posts himself as prescribed in paragraphs 429–431. Should the guide be changed, he hastens to his new post, except that he does not change post during an oblique movement. With this exception, the guide is always toward the guidon.

Gaits.

483. In changes of formation, the section which establishes the new direction and rate of march will be termed the directing section.

484. The following rules govern the gaits during changes of formation:

Rule No. 1.—When a change of formation requires certain sections to gain ground so as to reach specified positions abreast of the directing section, an increased gait may or may not be announced for the movement. If an increased gait is announced, the directing section maintains its gait; the other sections move at the gait announced until they have reached their new position, when they take the gait of the directing section.

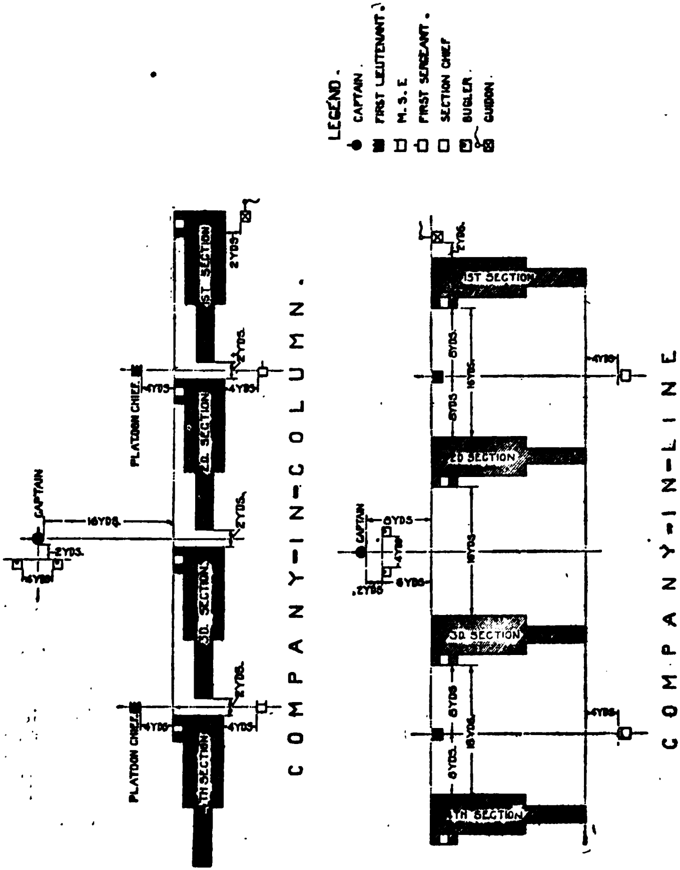


PLATE 5.—THE WIRE COMPANY.

If an increased gait is not announced, the directing section reduces its gait one degree; the others maintain their gait until they reach their new positions, when they take the gait of the directing section. If the movement is executed from a halt or while marching at a walk, and an increase of gait is not ordered, the directing section advances toward the front of the new formation and halts at command.

RULE No. 2.—When a change of formation requires the directing section to gain ground in order to precede the other sections, an increased gait may or may not be announced for the movement. If an increased gait is announced, the directing section takes the increased gait at once, the other sections take it up so as to follow the movement in their proper order.

If an increased gait is not announced, the directing section maintains its gait, the others reduce the gait one degree, and take the gait of the directing section in time to follow the movement in their proper order. If the movement is executed from a halt or while marching at a walk and an increase of gait is not ordered, the directing section moves at a walk, the others remain halted or halt and take up the gait of the directing section as before explained.

Reducing gait one degree is to be understood as passing from the gallop to the trot, from the trot to the walk, or from the walk to the halt. Increasing the gait one degree is the reverse.

To Form the Company Mounted.

485. The company is formed dismounted and marched to the stables by the first sergeant where he commands **BY SECTION FALL OUT.** The drivers then harness their teams and the men saddle their horses, under the direction of the chief of section. The latter then causes the wire cart of his section to be hitched up, verifies and makes an inspection of his section, causes it to mount, and reports the result to his chief of platoon. The chiefs of platoons then make an inspection of their platoons, after which the company is formed under the direction of the senior chief of platoon and brought to rest. On the arrival of the company commander the company is brought to **attention** by the senior chief of platoon. The captain then commands **REPORT.**

The chiefs of platoons then report in the order of rank, **(SUCH) PLATOON IN ORDER, SIR**, or reports the deficiencies shown by the verifications and inspections. The first sergeant then reports to the captain as prescribed in par. 189.

The master signal electricians, other members of the company staff, if present, and the guidon, take their posts when the company is formed. The buglers report to the captain at such time and place as he may direct. The chiefs of platoons join their platoons at the stable or picket line and superintend the formation of their platoons.

To Dismiss the Company.

486. The captain commands: **Dismiss the company.**

The chiefs of platoons and the master signal electrician fall out. The company is returned to the stables or picket line by the first sergeant, who then commands: **By section, FALL OUT.** The chiefs of sections supervise the placing of the transportation under shelter or in park; the horses in the stable or on the picket line; and see that horse equipment and harness has been properly put away, and that all equipment has been properly disposed.

To Align the Company.

487. The company being at a halt.

If the section on the side toward which the alignment is to be made is not in proper position, the captain establishes it in the position desired, and commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT.** At the command **dress** the other sections move forward or backward, the chiefs of sections aligning themselves; the men and drivers turn their heads to the right and dress on their corresponding elements in the section on their right. The captain places himself on the right of the leading element of the right section, facing to the left. He quickly establishes the leading element of the next secion to arrive on the line, and superintends the alignment of the other sections as they arrive on the line. The captain then commands **FRONT**, and takes his post.

To March to the Front.

438. 1. **Forward,** 2. **MARCH.**

Executed simultaneously by all the sections moving straight to the front, taking care to maintain their proper relative positions in the formation.

To Halt.

439. 1. **Company,** 2. **HALT.**

Executed by all sections stopping simultaneously, but not suddenly.

To March by the Flank.

440. 1. **By the right (left) flank,** 2. **MARCH.**

Executed simultaneously by all the sections executing column right, as prescribed in paragraph 410.

441. If the company is in line, with closed intervals, the following modifications apply: The movement is successive; the section on the indicated flank begins the movement by executing column right; the others take it up in turn so as to follow, at the proper distance, in the track of the sections which preceded them. If executed while marching, all the sections, except the one on the indicated flank, halt and then resume the march so as to follow at the proper distance in the column.

To March to the Rear.

442. 1. **Right (left) about,** 2. **MARCH.**

Executed simultaneously by all sections as prescribed in paragraph **411**, taking care to quickly track the section preceding them in the new formation, if the company was in column at the command, or to promptly take up the announced guide if it was in line.

443. If the company is in line with closed intervals, the following modifications apply: The captain first commands: 1. **Right sections forward,** 2. **MARCH.** The right section of each platoon moves forward so as to clear the left section. If the captain orders an increased gait for the maneuver, the right sections take the gait indicated; if an increased gait is not ordered, the left sections reduce the gait one degree, or, if halted, they remain halted. As soon as the right sections are clear of the left sections the captain gives the command for the about, which is executed by all the sections at the gait of the right sections. On the completion of the about the sections in rear increase the gait so as to move up to their positions in line.

To March Obliquely.

444. 1. **Sections**, 2. **Column half right (left)**, 3. **MARCH.**

All the sections execute column half right simultaneously, as prescribed in paragraph **412**. The sections move on parallel lines. The guide of each section takes care to align himself on the guide of the section toward which the movement is made. To resume the original direction, the command will be: 1. **Sections**, 2. **Column half left (right)**, 3. **MARCH.**

To Change Direction.

445. Being in section column: 1. **Column right (left)**, 2. **MARCH.**

The leading section executes column right, as explained in paragraph **410**; the sections in rear follow the leading section and turn on the same ground.

Column half right (half left) is similarly executed, except that the turn is only 45°.

446. Being in line: 1. **Right (left) turn**, 2. **MARCH**, 3. **Company**, 4. **HALT.** The pivot section executes column right. The other sections increase the gait one degree, preserving their intervals from the pivot section and take the gait of the latter on arriving abreast of it.

Company right half (left half) turn is similarly executed, except that the pivot section executes column half right.

If the company is marching at a gallop, the pivot section will take the canter at the command **march**; the other sections will take the canter when abreast of the directing section. When all of the sections are in line, the captain commands: 1. **Gallop**, 2. **MARCH.**

To Close or Extend Intervals in Line.

447. 1. **On (such) section,** 2. **Close (extend) intervals,** 3. **MARCH.**

The normal closed interval is 8 yards. If the captain wishes any other interval than the normal closed or normal interval to be taken, he announces the interval before giving the second command; for example: 1. **On first section,** 2. **To 20 yards,** 3. **Extend intervals,** 4. **MARCH.**

The indicated section moves straight to the front, the other sections incline toward or away from the indicated section and move to the front when at the proper interval. Paragraph **434** governs the gait.

To Form Section Column to the Front from Line.

448. 1. **Right (left) by section,** 2. **MARCH.**

The right section moves straight to the front. The other sections, in turn, move by the right flank, and follow in the column at 2 yards distance. Rule 2, paragraph **434** governs the gait.

To Form Line to the Front from Section Column.

449. To the front: 1. **Right (left) front into line,** 2. **MARCH.**

The leading section moves straight to the front. Each section in rear executes column half right until opposite its place in line, when it executes column half left, moves to the front, and takes its place on the line. Rule No. 1, paragraph **434**, governs the gait.

To Form Line to the Right (Left) from Section Column.

450. On the right (left): 1. **On right (left) into line,** 2. **MARCH.**

The leading section executes column right and moves straight to the front in the new direction; the other sections move forward beyond the preceding sections, and successively execute **column right** when opposite their positions in line with proper intervals, and then move forward until abreast of the leading section. When an increased gait is ordered all of the sections will take it, but the leading section will resume the original gait when it has turned out of column. If moving at a trot or gallop and no increased gait is ordered the leading section, after completing the turn, will decrease its gait one degree. As here modified, Rule No. 1, paragraph **434**, for gaits applies.

451. To form on right (left) into line at closed intervals the captain commands: **At closed intervals** before giving the prescribed commands for forming line; the company is then formed with 8 yards instead of the normal intervals.

452. To the right (left) : 1. **Right (left) into line**, 2. **MARCH.**

The leading section executes **column right** and moves straight to the front in the new direction; the other sections move forward and successively executes **column right** when they are in rear of their places in line to the right (left) of the leading section at closed intervals. They then move forward until abreast of the leading section. Rule No. 1, paragrayh **434**, governs the gaits.

453. To form line at intervals other than normal or closed intervals the captain commands: **At — yards interval**, before giving the prescribed commands for forming line; the company is then formed with the indicated intervals between sections.

To Form the Mounted Men of the Sections in Line.

454. This will always be done to the left.

1. **Sections**, 2. **Left front into line**, 3. **MARCH.**

This will be executed by the sections as prescribed in paragraph **413.**

To Re-form the Sections in the Normal Formation.

455. 1. **Sections**, 2. **Right by fours**, 3. **MARCH.**

To Form Platoon Column to the Front from Section Column.

456. 1. **Platoons**, 2. **Right (left) front into line**, 3. **MARCH.**

The leading section of each platoon moves straight to the front. The rear section executes **column half right** and then column half left, when by so doing it will have its normal interval from the leading section.

Rule No. 1, paragraph **434**, governs the gaits.

To Form Platoon Column to the Flank from Section Column.

457. 1. **Column of platoons, first platoon by the right (left) flank,** 2. **MARCH.**

At the first command the chief of the leading platoon commands: 1. **By the right flank.** At the command **MARCH** each section in the leading platoon executes **column right** as before described.

At the first command the chief of the rear platoon cautions **CONTINUE THE MARCH.** When it arrives in rear of the leading platoon, the chief of platoon commands: **By the right (left) flank,** adding **MARCH** in time to follow the leading platoon in trace.

To Form Section Column to the Front From Platoon Column.

458. 1. **Right (left) by section,** 2. **MARCH.**

The right sections of the platoons move straight to the front. The left sections execute column half right and then column half left, and follow in the rear of the leading sections.

Rule No. 2 governs the gaits.

Being in Line, to Form Platoon Column, to the Right (or Left).

459. 1. **Platoons,** 2. **Right (left) turn,** 3. **MARCH,** 4. **Company,** 5. **HALT.**

The right section of each platoon executes column right. The other sections increase the gait one degree, preserving their interval from the right section, and take the gait of the latter on arriving abreast of it.

Being in Platoon Column, to Form Line to the Right (Left).

460. 1. **Platoons,** 2. **Right (Left),** 3. **MARCH,** 4. **Company,** 5. **HALT.**

Executed as prescribed in the preceding paragraph.

Route Order and at Ease.

461. Marching in any formation: 1. **ROUTE ORD**
AT EASE. Executed as prescribed in paragraphs 14
The section column is the habitual column of rou
mounted men of the sections may, when conditions re
be formed in column of twos instead of column of
ing in march, route order or at ease are executed
the principles already prescribed. Sabers are
drawn. To resume attention the captain commands
ATTENTION.

The captain marches 8 yards in front of the leadin
followed at 2 yards distance by the trumpeters and
latter on the right; the chiefs of platoons usually
the rear of their platoons, but they and the chiefs
may go wherever their presence is necessary; the
march where the captain directs.

To avoid dust, the captain may direct the officer
closers to march on the windward side.

SECTION V.—EMPLOYMENT IN THE FIELD

GENERAL.

462. The main equipment of each of the four
is a two-horse reel cart carrying 5 miles of Sig
wire and the buzzers and other apparatus for
necessary stations. Wire can be laid out and re
gaits and stations established or discontinued

Buzzer wire carriers, each with a quarter m
can be used in emergency or where it is
the field wire. Each section carries 1½ miles
and buzzer wire carriers.

463. Whenever practicable, a reserve
kept on hand to provide for a sudden
or other station. For this reason the
take every opportunity to reel
often be done as the
quarters.

the route; (*b*) which offers the least diffi-
verse; and (*c*) due regard being had for the
which is the shortest and which involves the
possible amount of wire.
dent on the scouting party in front to mark
uncertainty may not arise as to the direction
marker is made to understand clearly:
be followed.
ar unit or units to be guided.
if any, to be delivered.
ns to be carried out or the route he is to
join his party.
indicates the correct route, acting as guide
terrain where the route is difficult to follow,
is mission is fulfilled hastens to replace the
rejoin his detachment or detail.
ment of well-understood conventions, or by
e signs, the number of markers may be re-
should be understood that a main traveled
indication, to be left for one that is notice-
and that a straight road is not, without indi-
for one which deviates from it. By marking
and buildings, or by other suitable signs, un-
minor nature may be removed. In important
marker should always be left at places where
may arise.
of the column for which the route is being
ithin view of a marker the latter signals the
former acknowledges with a countersignal.
countersignal should be distinctive and should
eviously agreed upon. The same signal and
re used throughout the detail.
designated for the foregoing are selected for
from the personnel of the sections and the com-
are carefully instructed in the duties they are to

dvantageous to have those men of a section
duty grouped in the station squad which is
ation.

stage. As large a reserve as possible of wire and equipment should be assembled at a central point with which to effect replacements and meet unexpected demands. It is advantageous and most usual to lay wire from a point near division headquarters outward. A principal advantage lies in the fact that the reel cart is thus placed at the end where changes of position are most frequent.

IN CAMP.

470. When the division goes into bivouac or camp the wire company establishes such tactical lines of information as may be indicated. These will usually be wire lines on the ground and will connect division headquarters with brigades and important outposts and observation points.

RESERVE WIRE CARTS.

471. The two extra wire carts in the company carry 10 miles of field wire each, which constitutes a reserve supply for issue to subordinate units when necessary. The captain regulates the issue and use of this reserve matériel in the most judicious manner for supplementing and replacing the equipment pertaining to subordinate units. The reserve wire carts and the company instrument wagon constitute a part of the company combat train and should march in rear of the company.

RECONNAISSANCE.

472. A most important preparatory measure for units of a wire company to take before actually laying indicated ground lines of information is to provide for as complete a reconaissance as time will permit of the route to be followed in laying the wire. Such reconnaissance will be accomplished by suitable reconnoitering or scouting parties detailed from the personnel of the sections or by such detachments from the company staff as the captain may direct.

473. These scouting parties will examine carefully the general route to be followed in laying the wire with a view to selecting the particular route (*a*) which best utilizes the existing matériel and artificial cover along the route; (*b*) which offers the least difficult terrain to traverse; and (*c*) due regard being had for the above, that route which is the shortest and which involves the laying of the least possible amount of wire.

474. It is incumbent on the scouting party in front to **mark the route** so that uncertainty may not arise as to the direction to be followed. A marker is made to understand clearly:

(*a*) The route to be followed.

(*b*) The particular unit or units to be guided.

(*c*) The message, if any, to be delivered.

(*d*) Other directions to be carried out or the route he is to follow in order to rejoin his party.

475. The marker indicates the correct route, acting as guide if necessary over terrain where the route is difficult to follow, and as soon as his mission is fulfilled hastens to replace the next marker or to rejoin his detachment or detail.

By the establishment of well-understood conventions, or by the use of suitable signs, the number of markers may be reduced. Thus, it should be understood that a main traveled road is not, without indication, to be left for one that is noticeably less traveled, and that a straight road is not, without indication, to be left for one which deviates from it. By marking arrows on trees and buildings, or by other suitable signs, uncertainties of a minor nature may be removed. In important cases, however, a marker should always be left at places where a reasonable doubt may arise.

When the head of the column for which the route is being marked comes within view of a marker the latter **signals** the former, and the former acknowledges with a **countersignal.** Both signal and countersignal should be distinctive and should have been previously agreed upon. The same signal and countersignal are used throughout the detail.

476. The men designated for the foregoing are selected for special aptitude from the personnel of the sections and the company staff and are carefully instructed in the duties they are to perform.

It will be found advantageous to have those men of a section designated for scout duty grouped in the station squad which is last to establish its station.

Additional men are designated from time to time to receive the instruction so that substitutes may be available. Alert, cool-headed, and intelligent men should be selected for this duty; they should be good horsemen and have good eyesight and hearing.

Each scout should be provided with a good field glass, a compass, a watch, a whistle, a field message book, and a pencil.

477. The training of a scout should have for its object:

1. To develop his powers of observation:
2. To teach him what to look for and how to recognize it.
3. To teach him how to report intelligently and concisely.

The scout's powers of observation and description are developed first of all by simple exercises. Thus he may be required to look at a given section of terrain and describe what he sees in it.

The scout is made to appreciate the lay of the land as indicated primarily by its drainage, and secondarily by other natural features, and by the works of man. A good eye for country is thus to be acquired; the scout learns to appreciate the configuration of a terrain which may be only partially visible to him, and thus to deduce the most favorable routes for traversing it and the most probable positions for hostile occupation.

The scout must also be taught to distinguish troops of the different arms, to recognize their formations, and to familiarize himself with their usual methods of action.

The scout must be trained (*a*) to use field glasses; (*b*) to read maps; (*c*) to make reports, both verbal and written; (*d*) to make route sketches.

LAYING THE LINE.

478. Slack will be pulled back and the wire tied in every 500 or 600 yards or when the section chief directs. The line will always be tied at turns in such manner as to prevent the wire from crossing the roads. Under no circumstances will the wire be so tied as to subtend the arc formed by any turn in the road. Should a number of turns come together, the cart will be halted until the work is satisfactorily performed. Ties will be made by two round turns and a half hitch, around bushes, trees, or anything fixed in the ground, and as close to the ground as possible.

At points where the line crosses roads or at crossroads the line will be raised overhead or buried, unless the road is little traveled, when it may be tied on each side with plenty of slack. When there is nothing to tie to, stones will be placed on the wire on either side of road.

Generally the wire will be laid to one side of the roadbed to avoid unnecessary damage to the wire from wheels, but in unfenced country, where mounted men and stock may approach the road from the adjacent fields, it will frequently be advisable to lay it in the road, so that it will be flat and also be more easily seen.

Plenty of slack wire always will be taken, so that it will drop off the feet of animals passing over it, without breaking the wire or throwing the animal.

In crossing railroads or trolley lines, the wire is cut and the ends run under the rails. To prevent delay, a man of the section will be dropped off at such crossings and connect the wire, then overtake the section at an increased gait.

In passing through villages, the wire will be placed overhead on telegraph and telephone poles. A man will be dropped for this work; when completed, he overtakes the section. Men left behind in laying the wire, for any duty, will follow the line in overtaking the section, looking for breaks.

The gait to be taken in laying lines will depend on the kind of troops the section is following and the speed made by them. In all cases the line will keep in touch with the element for which it is to transmit information. When the last station is cut in, horses may be unhitched if the troops seem likely to remain in place any length of time.

On the care with which lines are laid will depend in no small degree their efficiency. Carelessly laid lines will need much attention to repair breaks, and will cause many delays in messages, and no end of annoyance to other troops.

Speed will always be sacrificed to carefulness in this work.

OPERATING THE LINE.

Stations and Call Letters.

479. Each section will be assigned call letters for four stations, which in general should not exceed four. The first section will be given the letters A, B, C, and D; the second section the letters F, G, H, and K; the third section, M, N, Q, and R; the fourth section, S, U, W, and X. The stations are assigned the call letters in order of establishment, not location, beginning with the first letter. The call of headquarters is KO, which will be its call whenever it may be on the line, suspending for the time being the letter of the station where it may be. This applies to the first station established as well as to the later ones.

Branch lines electrically connected with the main line have offices given calls as if on the main line.

An office on a branch line not connected with the main line will be assigned the call letter of the station where the branch goes out, adding J to it.

480. As soon as a station is established the operator will call up the initial station and report. The opening of all stations, including the initial station, will be reported to the officer or noncommissioned officer in charge of the line, and by the latter to the company commander and to the commanding officer for whose use the line was established.

Each operator will have his personal sign, as Smith "SM," Johnson "JO," etc.

481. To open station with buzzer the operator will attach the buzzer connector to the line wire and ground rod. Care will be taken that the teeth of the connector have penetrated the insulation of the line wire. Damp ground will be sought for the ground rod; if not available the ground will be dampened around it with water from the canteen.

The operators will not leave their buzzers unless properly relieved by higher authority.

At night, when lanterns are necessary at a station, the light must be so placed as to conceal it from hostile observation.

When it becomes necessary to move a station some distance from the line, and it is not practicable to use field wire for extending the line, the buzzer wire carried by the lineman may be used.

The buzzer carried by the lineman may be used for opening stations on branch lines.

482. Stations will be conducted in a military manner. Silence will be preserved, except conversation relative to business. The lines will not be used for conversational purposes between operators.

Buzzers will be kept dry. In case of wet weather the shelter tents of messenger and operator will be made into an office.

No unauthorized persons will be alllowed around stations.

MAINTAINING THE LINE.

483. Each lineman will be equipped with a carrier with one-fourth mile buzzer wire and a buzzer for testing the line. This will enable linemen to determine in what part of the line a break may be. Intermediate stations will assist in this, and when the section in which the break exists has been located the messenger or any available man will be sent to find and repair it if no lineman is at hand. In following the line to locate breaks the lineman will take up the gallop, following the line with his eye where it is raised from the ground and with the pike where it is on the ground. He picks it up with the hook. In order to prevent a knot or splice from being caught in the hook and jerking the pole from his hand he raises the pike in a horizontal position, slips the wire out of the hook and onto the handle, and allows the wire to run on it near the hook, the shoulder of the hook keeping it from slipping off. By lowering the pike and turning it around in the hand the wire slips quickly to the ground.

484. To repair a break the ends will be first scraped, the scraped ends tied in a square knot, the loose ends twisted around the line wire, and all carefully insulated with tape. The knots should be pulled tight and made as small as possible, so that in reeling up the knots will not jerk the pike and glove from the hand.

485. Lines which have been hastily laid will be patrolled at once, the linemen proceeding from each end until they meet, reporting from there by wire to their sections for instructions. In thus patrolling lines it will be with a view to placing the wire flat on the ground, should it have become taut after the section passed, and otherwise arranging it to lessen the likelihood of breaks. Should a line cross a macadamized road, heavily traveled by artillery and cavalry, with no means to place it overhead, a lineman will be left at the point to repair any possible break. Should travel over the road practically cease, he will ask for instructions by wire.

Frequent patrols will be made over lines which pass over fields of grain, weeds, or underbrush in unfenced country, and can neither be placed flat on the ground nor overhead. Breaks are more apt to occur with lines thus laid.

On all occasions in handling wire, such as reeling it on to the reels in filling them or reeling it off for repairs, the section chief will have leaks in insulation repaired and all connections looked over. This aids materially in the working of the lines when the wire is laid.

RECOVERING THE LINE.

486. Wire will not be picked up at a faster gait than a trot. Should a more rapid gait become necessary to escape capture, the wire will be cut and abandoned. The real object is to lay wire and not to pick it up. Should wire have to be abandoned, the cart will refill its reel at the earliest possible moment from the reserve. Wire will only be temporarily abandoned at maneuvers. The section will return for it when the maneuver is completed. Under no circumstances will wire be reeled up on the reels or spools until any breaks in the metallic continuity of the wire have been repaired.

USE OF IMPROVISED MATÉRIEL.

487. The use of improvised matériel found in the field for the purpose of transmitting buzzer signals is of the greatest importance. To properly utilize such matériel a thorough knowledge of the power of penetration of these signals, both directly and inductively, is necessary. The utilization of improvised lines serves to extend considerably the radius of action of the wire company, and is particularly valuable when, due to exigencies of service, a part of its supply of wire has been lost or destroyed. When opportunity for so doing offers, much time and labor will be saved by employing this method instead of laying regular field lines. While the procedure is simple in theory, much actual practice and experience must be had by the wire company which expects to secure efficient lines of information by this means.

The commonest extraneous means for transmitting buzzer signals are overhead lines, wire fences, and railroad rails.

Overhead lines, either telegraph or telephone, can be advantageously used. In the former case the use of the buzzer has no effect on regular telegraph operation; in the latter interference must be expected, but the bad effects will inure almost wholly to the telephone users.

Wire fences, especially if new, make excellent field lines. It is best to connect to but one wire, as the decrease in resistance due to connecting to several does not compensate for loss of insulation and increased capacity thereby accruing.

The use of railroad rails is not generally satisfactory except for short distances, 5 miles being about the maximum at which signals can be read, and unless it is certain that the same rail is used by both stations, both rails should be connected. Another great disadvantage of the use of track rails is that the circuit breakers for railway warning signals at crossings obstruct the buzzer signals. Care should therefore be taken to bridge such faults wherever found.

Remarkable results can be gotten on improvised lines by taking advantage of the inductive qualities of the buzzer. In this case the primary circuit can be either a specially strung loop of field wire, a wire fence, or an overhead wire. In some cases no loop at all is necessary, a single connection without extra ground frequently giving excellent results. If a grounded loop is used, it should be about 500 yards long and well grounded. In any event, the circuit should be tried with and without grounding to discover which method gives the better results in any particular case. Induction methods imply the existence of at least one and preferably of several overhead wires. Its great advantage lies in the fact that if any of the several overhead wires radiate at various points the signals are transmitted along each, allowing other stations to be established at almost any point in the vicinity.

Frequent drills and practice should be had by wire companies with improvised field lines as being most valuable adjuncts to the laying of lines from the cart.

CHAPTER III.—THE RADIO COMPANY.

SECTION I.—GENERAL.

FUNCTION AND EMPLOYMENT.

488. The radio company is used by the commander of a division for maintaining communication with adjacent columns, with the divisional cavalry, and in other instances when distance, the character of service, and the nature of the terrain prevent the laying of wire lines. The radio company usually serves to connect division headquarters with the divisional trains and, pending the construction of semi-permanent lines, with the radio station at Army corps headquarters in rear. These radio facilities may also be used to intercept messages sent by the enemy or to interfere with the operation of his radio stations.

ORGANIZATION.

489. The radio company is organized into the necessary headquarters and company staff, two platoons of two pack radio sections each, and one wagon radio section.

For drill the company is formed, as above, the wagon radio section forming a provisional platoon on the left of the company. In the field or on the march the company instrument wagon forms a fourth platoon under command of the supply sergeant.

490. The organization, in detail, is as follows:

1 captain.
2 first lieutenants.
1 master signal electrician.
1 first sergeant (sergeant, first class).
1 supply sergeant (sergeant).
1 stable sergeant (sergeant).
1 mess sergeant (sergeant).
1 horseshoer.
1 clerk (corporal).
1 farrier (corporal).
1 saddler (corporal).
1 mechanic (corporal).
2 cooks.
1 driver (private, first class).
2 buglers (privates, first class, one acting as guidon).
4 radio sections, pack.
1 radio section, wheel.

DUTIES OF INDIVIDUALS.

491. The duties of individuals in the various grades are identical with those of the same grades in the wire company.

SECTION II.—THE PACK RADIO SECTION.

COMPOSITION.

492. The pack radio section is normally composed of 10 mounted men and 3 pack mules, designated the "generator" mule, the "chest" mule, and the "kit" mule. If a fourth pack mule be present with the section it will be designated the "supply" mule.

The organization, in detail, is as follows:

1 section chief (sergeant, first class).
2 operators (1 sergeant, 1 corporal).
1 messenger (private, first class).
4 antenna and counterpoise men (1 corporal, 3 privates, first class).
2 horseholders (1 private, first class, 1 private).
Total, 10.

493. The manner of packing the mules in a pack radio section is prescribed in paragraph 898. Improvised basket cinchas may be used to advantage in packing the kit mule and, when present, the supply mule.

FORMATION.

494. The section is formed in column of twos as prescribed in "The Soldier Mounted." Each mule is led by one of the men and, with its driver, forms a two.

POSTS AND DUTIES OF INDIVIDUALS.

495. The chief of section is on the left of the leading two except that when the section is acting alone he may go where his services are most needed.

The other men are numbered from 1 to 9, Nos. 1 and 2, the operators, form the leading two, No. 1, the sergeant operator,

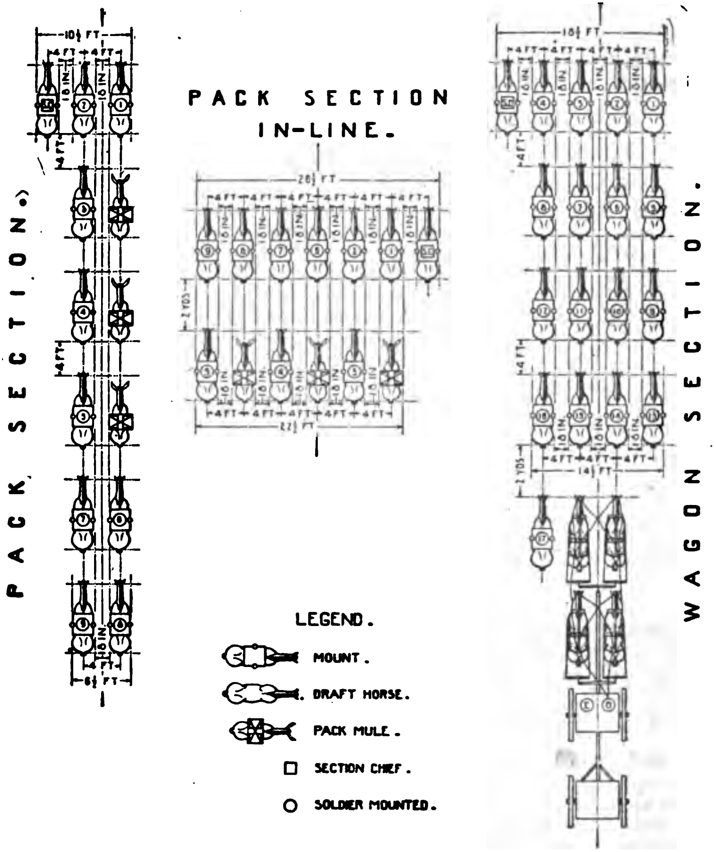


PLATE 6.—RADIO SECTIONS.

on the right. These are followed by Nos. 3 and 4, horseholders, and No. 5, the messenger, leading, respectively, the kit, generator, and chest mules. Mule drivers march on the left of their led mules. The mules are followed by Nos. 6, 7, 8, and 9, antenna and counterpoise men, in column of twos with Nos. 6 and 8 on the right. It is the duty of No. 6 to observe the packs and keep up any lagging mules. The antenna squad corporal is No. 9. If a supply mule be present it is led by No. 6, and the duty of observing packs and keeping up lagging mules devolves upon No. 8.

It is the duty of all men so far as they may be able in addition to leading their own mules, to urge forward the mule immediately in front.

DRILL OF THE SECTION.

The Guide.

496. The guide of the section is the chief of section. In the absence of the chief of section, the left man of the leading rank is the guide.

The Marchings.

497. The pack section executes the **march to the front**, the halt, the **changes of direction, the march to the rear**, and the **oblique march**, as prescribed for the wire section, substituting "twos" for "fours" wherever found and omitting reference to the carts.

To Form to the Front in Two Lines.

498. 1. **Left front into line**, 2. **MARCH.**

This will be executed by forming in two lines, with 2 yards distance, the first line being composed of the men not leading mules, the second being composed of the pack mules and their drivers. Each line is formed in a manner similar to that described in paragraph **295.** Mule drivers wait until the mounted men in rear pass them before forming front into line. The chief of section takes his place on the right of the leading rank.

This movement will always be executed to the left.

Rule 1, paragraph **434**, governs the gaits, substituting "two" for "section."

To Re-form the Section in Normal Formation.

499. 1. **Right by twos**, 2. **MARCH.**

The right two moves straight to the front, the other twos successively oblique to the right front, when disengaged, so as to follow in their proper places in column. The chief of section resumes his post on the left of the leading two.

Rule 2, paragraph **434**, governs the gaits, substitnting "two" for "section."

To Form in Column of Files.

500. 1. **By file**, 2. **MARCH.**

Executed as indicated in paragraph **297.** Each mule driver precedes his mule.

Rule 2, paragraph **434**, governs the gaits, substituting "two" for "section."

To Re-form in Column of Twos.

501. 1. **Form twos**, 2. **MARCH.**

Executed according to the principles indicated in paragraph **299.**

Rule 1, paragraph **434**, governs the gaits, substituting "file" for "section."

To Open Station.

502. Being in normal formation: 1. **Open station**, 2. **DISMOUNT.**

At the command **OPEN STATION**, Nos. 3 and 4 stand fast; No. 1 executes individual right about, chief of section and No. 2 left about; No. 6, moving along right flank of column, comes in alongside No. 1; No. 8 comes in alongside No. 6; No. 7, moving along left flank of column, comes in alongside the chief of section; No. 9 comes in alongside No. 7; No. 5 leads his mule left front into line on No. 4. At the command **DISMOUNT**, all pass reins over horses' heads and dismount. Chief of section, Nos. 1, 2, 6, 7, 8, and 9 turn their horses over to No. 3, and proceed to unpack the generator and chest mules. Nos. 4 and 5, holding their mules in place, move their horses out of the way. No. 1 working on right side and No. 2 on left side, with No. 8 assisting, unpack generator mule. No. 6 working on right side and No. 7 on left side, No. 9 assisting, unpack chest mule. The equipment will be placed on ground 1 yard in rear of mules, iron ferrules of mast pointing to rear. Nos. 4 and 5, after seeing that all loose straps and cinchas are crossed over mules, lead off their horses and mules and turn them over to No. 3. No. 4 moves up on the right and No. 5 on the left of No. 3. As soon as the mules are unpacked Nos. 6 and 7 open antenna bag and distribute antenna reels, the chief of section places top insulator into top joints of mast, and distributes pins to Nos. 1, 2, 6, and 7, who secure antenna, snap their antenna into insulator, and reel out their antenna wires. No. 1 goes to right and No. 2 to left of horses, their antenna wires forming an angle of 90 degrees, No. 6 opposite No. 2 and No. 7 opposite No. 1, and then face mast and watch the chief of section for signals. The chief of section and No. 4 then raise the mast hand over hand; No. 5, assisted later by No. 4, connects up chest and generator, antenna, and counterpoise leads. As soon as bottom joint is in place and mast vertical, chief commands **tie in**, when the antenna men secure their antenna cords to pins and return to mast; Nos. 8 and 9 reel out the counterpoise directly under the antenna wires. In their absence this will be done by Nos. 6 and 7. The chief of section details the necessary operators, messengers, men to turn generator, guards to protect antenna and over animals.

Each man, having a permanent assignment of duty, soon learns to do his part quickly, and after the men have become proficient in handling the equipment the entire operation of unpacking and opening station may be effected by the command **open station.**

To Close Station.

503. At the command **CLOSE STATION**, the chief of section and No. 4 immediately start lowering the mast; Nos. 1, 2, 6, and 7 move rapidly to their respective antenna cords, face the mast, and watch for signals. They place their antenna pins in leggings and, when the mast is down, reel up without waiting for command. The chief of section unsnaps all antenna wires from top insulator, throws them clear, and then reels up antenna lead. No. 5 closes and secures chest for packing, while No. 4 attends to generator, after which they secure their respective horses and mules and spot the latter for packing. Nos. 8 and 9 reel up the counterpoise and place it in bottom of bag. In their absence this will be done by Nos. 6 and 7. The chief of section packs away antenna reels and secures pins. Nos. 1 and 2, No. 8 assisting, pack generator mule. Nos. 6 and 7, No. 9 assisting, pack chest mule. Men, when they find themselves no longer of assistance in packing mules, will promptly secure their horses, mount up, and form column, No. 3 being the base. The section forms in column, facing in the same direction as when **open station** was given.

SECTION III.—THE WAGON RADIO SECTION.

COMPOSITION.

504. The wagon radio section is normally composed of 20 men, and one wagon radio set drawn by four horses. All men are individually mounted except the driver and the engineer, who ride on the wagon.

The organization in detail is as follows:

1 section chief (sergeant, first class).
3 operators (1 sergeant, 2 corporals).
3 mast men (1 sergeant, 2 privates, first class).
1 engineer (corporal).
8 antenna, counterpoise and guy men (1 corporal, 7 privates, first class).
1 messenger (private, first class).
1 driver (private, first class).
2 horseholders (privates).

Total, 20.

FORMATION.

505. The mounted men of the section, less the chief of section and one horseholder, are formed in column of fours as prescribed in "The Soldier Mounted." The wagon is posted so that the lead horses are 2 yards in rear of the column of fours and in such a position that the pole of the wagon is in prolongation of the interval between the numbers 2 and 3 in the mounted ranks.

POSTS AND DUTIES OF INDIVIDUALS.

506. The chief of section is on the left of the leading four, two, or file, except that when the section is acting alone he may go where his services are most needed. Beginning with No. 1 on the right of the leading four and going to the left, thence beginning at the right and going to the left of each succeeding four, the remaining mounted men of the section are numbered consecutively from 1 to 17 for the purpose of describing their duties. Nos. 1, 2, and 3 are operators; No. 1 being the senior operator; No. 4 is the messenger; Nos. 5, 6, and 7 are the mast men; No. 5 being the senior and in charge of the mast detail; No. 8 is a horseholder; Nos. 9, 10, 11, and 12 are the antenna men; No. 9 being the senior and in charge of the antenna and counterpoise detail; Nos. 13, 14, 15, and 16 are the counterpoise and guy men; No. 17 is the remaining horseholder and marches on the left of the leaders except that on the march he may ride in rear of the wagon.

THE WAGON RADIO SET.

507. The wagon radio set is carried on a pintle-type wagon. It consists of the necessary technical radio apparatus, an engine, a dynamo, a jointed mast, antenna and guy ropes, and the counterpoise. The technical radio apparatus is attached to the front, and the engine and dynamo to the rear element, and electrically connected with the instruments by cable. On the rear vehicle are also carried the mast, consisting of 10 sections 8 feet in length; the antenna, which has nine cords, one of which is the connecting cord; two sets of guy ropes, four to each set; and the rubber insulated wire counterpoise, consisting of eight branches.

DRILL OF THE SECTION.

Maneuver.

508. The section is maneuvered by the methods and means prescribed for the wire section, where applicable.

By [illegible] Section.

[illegible] The [illegible] the [illegible] of the sta-[illegible] [illegible]

[illegible] his [illegible] [illegible] sufficient distance [illegible] the mast [illegible] turned over to [illegible] then relieved [illegible] and mak-[illegible] his duty to [illegible]

[illegible] Nos. 3 and 4 [illegible] prepared [illegible] of the [illegible] the point at [illegible] unpack [illegible] antenna maker [illegible] unpack [illegible] direction of the [illegible]

[illegible] No. 7 places [illegible] the point [illegible] places the [illegible] Nos. 3 and 4. [illegible] form the [illegible] in [illegible]

[illegible] Nos. 10, 11, and [illegible] This will [illegible] No. 10. Each [illegible] necessary pins in [illegible] 15, and 16. [illegible] a hammer. [illegible] manner. [illegible] between No. 9 [illegible] and No. [illegible] antenna and [illegible] proper [illegible] direction of Nos. 3 and

6. No. 5 will direct 9, 11, 13, and 15, and No. 6 will direct 10, 12, 14, and 16. When it is desired that an antenna or guy be pulled out, the command **out** will be used, as No. — **OUT.** When it should be slacked off, the command **in** will be used. The guy ropes which each guy man holds are referred to, respectively, as **upper** and **lower.**

When the mast is up to the required heighth the chief of section commands **TIE IN.** At this command the guy men, with the assistance of Nos. 6 and 7, if necessary, drive pins in the ground and secure their guys. Antenna men, with the assistance of Nos. 6 and 7 or guymen, if necessary, drive a pin in the ground and secure the proper antenna cord. They then secure the remaining cord in a similar manner midway between those first placed. In doing this all move to the right from the antenna cord first secured.

As soon as the command **tie in** is given, No. 5 makes the proper connection for the antenna and counterpoise, while No. 6 supervises the tying in and sees that cords and ropes are kept taut.

510. As soon as the driver unhitches his team, the engineer will see that there is sufficient gasoline in the tank, oil in the cups, water in the proper receptacles (if the engine is water cooled), and connect the dynamo to the instrument by means of the cable and generally make ready to start the engine and dynamo.

When the mast is up the chief of section details the operators, messengers, and guards for the antenna and guys, and makes such disposition of the remaining men as the situation demands. If the station is to be maintained open any length of time, he also directs that the picket line be established or the horses otherwise disposed of.

The driver takes care of his team.

To Close Station.

511. At the command **close station,** the operator removes the antenna and counterpoise connections, the guy men take up the pins and hold the guys, each antenna man first takes up the pin and frees the end of the antenna cord which he last secured and turns it loose, then proceeds to his other antenna cord, pulls up the guy and holds the reel while the mast is being lowered. The mast is lowered by the same men in the same positions as when being raised. Nos. 3 and 4 lower the antenna and guy men. The operator, as soon as he [illegible] the counterpoise and the [illegible] [illegible] brings his [illegible] [illegible] and when the mast is [illegible] [illegible] it to the [illegible]. All men [illegible] [illegible] which they [illegible]. When all the [illegible] has been securely packed the chief of section [illegible] stand to horse, when all men proceed to their horses and [illegible] this command. The men are then mounted and the section is formed by the appropriate commands.

512. In packing and unpacking all men who have finished their [illegible] [illegible] [illegible] may be directed by the chief of section to [illegible] and such other duties as may be necessary.

SECTION IV.—THE RADIO PLATOON.

513. The radio platoon is composed of two radio pack sections commanded by a lieutenant.

The matter contained in "The Wire Platoon" is applicable to the radio platoon except that the interval between sections in the column of files is approximately [illegible] yards.

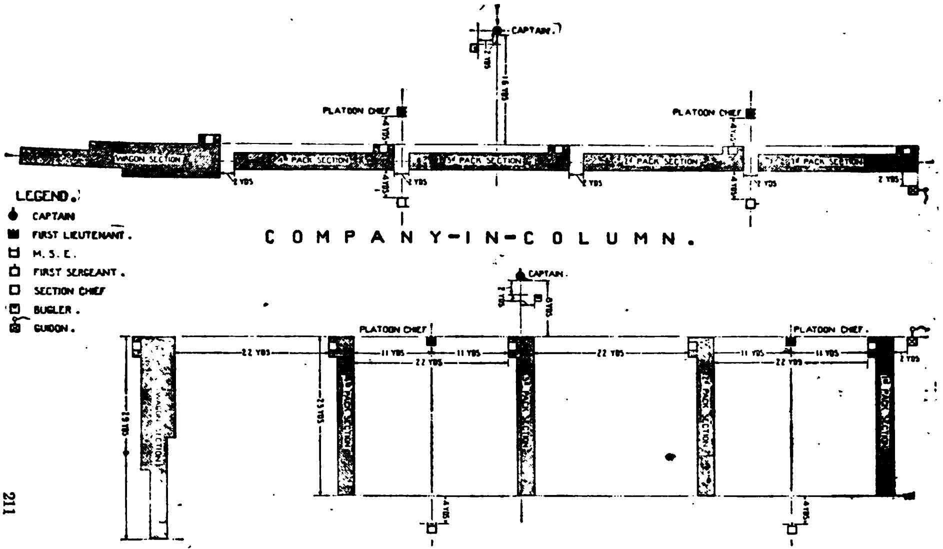
SECTION V.—THE COMPANY.

FORMATION OF THE COMPANY AND POSTS OF INDIVIDUALS.

514. The company is formed and individuals therein are posted as prescribed for the wire company.

DRILL OF THE COMPANY.

515. The same movements in maneuver executed by the wire company are prescribed for the radio company, and in so far as not entirely impracticable, the same commands, methods, and means are employed in maneuvering the latter as obtain in maneuvering the former. Whenever "The Section" is referred to in the maneuver drill prescribed for the wire company it will



COMPANY-IN-COLUMN.

COMPANY-IN-LINE.

PLATE 7.—THE RADIO COMPANY.

be understood that for the purposes of this section reference to "The Pack Radio Section" or "The Wagon Radio Section," as pertinent, is intended.

SECTION VI.—EMPLOYMENT IN THE FIELD.

GENERAL.

516. The main equipment of each pack radio section is one pack radio set actuated by a hand generator, and that of the wagon radio section is one wagon radio set actuated by an engine-driven dynamo. Component parts of these sets are as indicated from time to time in War Department orders. The company instrument wagon carries a spare pack radio set. The pack radio set has a range of 20 to 30 miles, depending on conditions. The set can be unpacked, the mast erected, station opened, and messages started in 2½ minutes. The wagon radio set has a range of 150 to 250 miles, depending on conditions. The set can be unpacked, the mast erected, station opened, and messages started in 10 minutes.

ASSIGNMENT OF SECTIONS TO DUTY.

517. In general, the wagon set remains with headquarters. The pack sets can be so disposed that the division commander can send to and receive messages from the divisional cavalry and other important units with which radio communication is desired.

The field battalion at army corps headquarters can, if desired, make use of the larger and more powerful motor truck radio sets available there for keeping in touch with the advancing organizations.

SELECTION OF STATION SITES.

518. The selection of station sites involves on the part of those charged with that duty a suitable reconnaissance of the terrain, according to the principles laid down in "The Wire Company," a knowledge of the possibilities and limitations of the station to be erected and a consideration of the tactical needs and probable developments. The locality for the station will be selected with as much care as the time available and conditions will permit.

High open ground as far from near-by hills as practicable is to be preferred, due regard being had for cover and security of the station. The nearer the station is placed to the commanding officer or to the headquarters of the command with which the section is serving, the better.

If not impracticable the site selected should permit the full spread of antenna and guy ropes. The greater the spread of the antenna wires, the farther they are from the ground and the greater the capacity.

INSTRUCTIONS FOR THOSE IN CHARGE OF FIELD RADIO STATIONS.

519. Be sure you know the organization which you are serving and the commander to whom you report and are responsible.

Familiarize yourself promptly with the call letters and locations of all stations with which you are in communication; likewise, with the location of your own troops and the names of commanders.

Arrange for the subsistence of the men and the foraging of the animals.

Constant attention to instruments and minor repairs made immediately will avoid serious breakdowns.

In receiving, attention to the insulation of the set and the mast from the ground is very important.

CHAPTER IV.—THE OUTPOST COMPANY.

SECTION I.—GENERAL PROVISIONS.

FUNCTION AND EMPLOYMENT.

520. The general function of the outpost company is to extend the lines of information in the division forward of the brigade. Specifically, its normal function is to furnish telephone communication between the infantry brigade commander and his regimental commanders in combat. In addition, it may be called upon to supplement the work of the other companies of the field battalion wherever the same may be necessary or desirable.

521. Conditions of employment will probably cause the frequent dispersion of the fractions of the company among the divisional units for long periods of time. For this reason the personnel should be inculcated with the highest possible degree of discipline and should have unquestioned ability to maintain itself in the field.

ORGANIZATION.

522. The outpost company is organized into a company headquarters and three platoons.

The organization, in detail, is as follows:

1 captain.
4 first lieutenants.
1 master signal electrician.
1 first sergeant (sergeant, first class).
1 mess and supply sergeant (sergeant).
1 stable noncommissioned officer and farrier (corporal).
1 clerk (corporal).
1 horseshoer.
2 cooks.
1 saddler (corporal).
1 driver (private, first class).
2 buglers (1 as guidon (privates, first class)).
3 platoons (21 men each).

DUTIES OF INDIVIDUALS.

523. The duties of officers and men in the various grades are identical with those of similar grades in wire and radio companies.

The captain, lieutenants, master signal electricians, first sergeant, buglers, assistant platoon chiefs, the chiefs of headquarters sections, and 1 lineman in each platoon are individually mounted.

SECTION II.—THE PLATOON.

TACTICAL EMPLOYMENT.

524. In the outpost company the platoon is the working unit. It is specifically designed, as to personnel and matériel, to furnish practical telephonic communication within the infantry brigade. In the normal case it connects the higher brigade units in combat; in other cases it furnishes such lines of information as may be ordered by the brigade commander.

While operating, the platoon is habitually detached from its company and attached to some other unit, normally the infantry brigade. Under such conditions it receives all orders from and follows any directions given by the commander of the unit to which assigned.

Communication furnished by outpost platoons is not intended to supplant other authorized methods. It is intended to be supplemental and additional thereto.

COMPOSITION.

525. The platoon is composed of 21 enlisted men, commanded by a first lieutenant.

It consists, in detail of the following:

1 platoon chief (first lieutenant).
1 assistant platoon chief (sergeant, first class, or sergeant).
1 headquarters section (4 enlisted men).
1 switchboard section (4 enlisted men).
3 telephone sections (4 enlisted men each).
Total, 1 officer and 21 enlisted men.

The combat transportation of the platoon consists of 3 pack mules.

526. The platoon chief, assistant platoon chief, chief of headquarters section, and one lineman belonging to the headquarters section are individually mounted. The three pack mules of the platoon are habitually attached one to each of the three telephone sections, a lineman being detailed to act as driver.

DUTIES OF INDIVIDUALS.

527. On detachment of the platoon from its company an assignment with a tactical unit of line troops, the duties platoon chief assimilate those of a company commander. To be readily able to meet this condition platoon chiefs should constantly exercise administration, supervision, and control over their commands. Platoon unity of action is paramount in all outpost company training.

The assistant platoon chief is not attached to a section. He assists the platoon chief in the performance of his duties and is always prepared to take command of this unit if circumstances render such action necessary.

The duties of the several noncommissioned officers and enlisted men belonging to sections are described under the paragraph relating thereto.

NUMERICAL DESIGNATION OF MEMBERS.

528. The men of the outpost platoon, except the platoon chief and assistant platoon chief, are numbered from 1 to 20 for the purpose of prescribing their positions and duties in the various drills and formations.

*1.	Sergeant, section chief.	Headquarters section.
2.	Private, first class, telephone operator.	
3.	Private, first class, telephone operator.	
*4.	Private, first class, lineman.	
5.	Corporal, section chief.	Switchboard section.
6.	Private, first class, switchboard operator.	
7.	Private, first class, switchboard operator.	
8.	Private, lineman.	
9.	Corporal, section chief.	First telephone section.
10.	Private, first class, telephone operator.	
11.	Private, first class, lineman.	
†12.	Private, lineman.	
13.	Corporal, section chief.	Second telephone section.
14.	Private, first class, telephone operator.	
15.	Private, first class, lineman.	
†16.	Private, lineman.	
17.	Corporal, section chief.	Third telephone section.
18.	Private, first class, telephone operator.	
19.	Private, first class, lineman.	
†20.	Private, lineman.	

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* Mounted.

† Mule driver.

FORMATIONS AND POSTS OF INDIVIDUALS.

529. The habitual formations of the platoon are: **In column and in line.**

530. The formation **in column** is that in which the sections in double rank follow each other in the order, headquarters section, switchboard section, telephone sections in numerical order, from front to rear. The mounted men and mule drivers march in column of pairs at the rear. (Plate 8.)

531. The formation **in line** is that in which the sections are abreast of each other from right to left in the order, headquarters section, switchboard section, telephone sections in numerical order, the dismounted men of the sections being formed in double rank, the mule drivers and mounted men forming a third rank 2 yards in rear. (Plate 8.)

532. The platoon is habitually formed and maneuvered in column; the formation in line is had preliminary to technical operations and for inspection.

533. For the purpose of enlarging the front of the column and economizing road space, the length of the column may be reduced by closing the dismounted men to column of fours.

Conversely to permit the passage of obstacles and the traversing of difficult terrain, the front of the column can be contracted by forming both mounted and dismounted men in column of files.

MANEUVER.

General Rules.

534. On account of the small size of the outpost platoon, the movements prescribed for its maneuver are as simple in character and as limited in number as is possible to accomplish efficient handling.

535. Whenever possible, and in all cases where not otherwise prescribed, the maneuver of the dismounted men will be in accordance with the principles laid down under "Dismounted Instruction"; that of the mounted men and mule drivers in accordance with the principles of "Mounted Instruction."

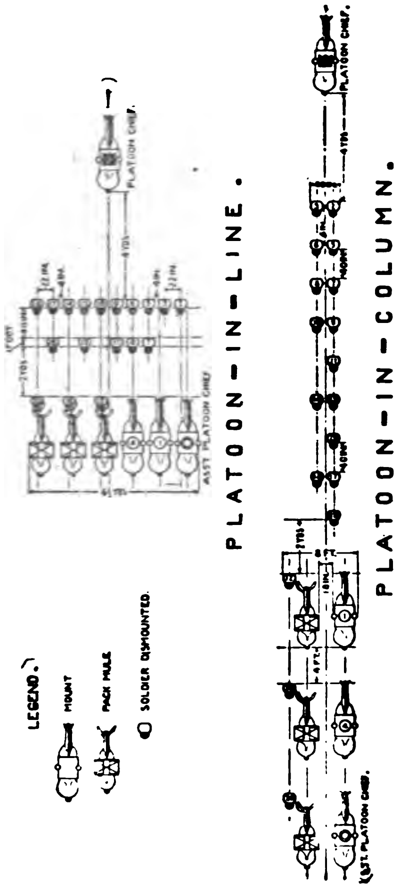


PLATE 8.—THE OUTPOST PLATOON.

586. Wherever the term **section** is used, it is intended to mean **dismounted section,** or that part of the section included in the dismounted rank. Where the term **mounted man** is used, it is intended to include both men actually **mounted and mule drivers.**

To Form the Platoon.

587. The mounted men are marched to the stables by the assistant platoon chief, who superintends the harnessing and the saddling. The dismounted men are marched to the storerooms by the senior dismounted noncommissioned officer under whose direction the equipment is procured. The chief of each telephone section then superintends the packing.

The assistant platoon chief then forms the platoon in column, verifies, and makes an inspection of it. He causes the mounted men to mount, reports the result of his inspection to the platoon chief, and takes his post.

To Dismiss the Platoon.

588. The platoon chief commands: **DISMISS THE PLATOON.** The platoon is marched to the storerooms by the assistant platoon chief. The chief of each telephone section superintends the unpacking. The mounted men are then marched to the stables by the assistant platoon chief, who superintends the unpacking, unsaddling, the disposal of horse and pack equipment, and the placing of the animals in the stable or on the picket line. The senior dismounted noncommissioned officer is charged with the proper disposal of the platoon technical equipment.

To March to the Front.

589. Being at a halt: 1. **Forward,** 2. **MARCH.** Executed by the dismounted rank in accordance with principles laid down in paragraphs **76, 77, 79,** and **104.**

Executed by the mounted rank in accordance with principles laid down in paragraph **285.**

The guide of the platoon is its left leading file unless otherwise announced.

540. The platoon in any formation may be marched in double time, the dismounted ranks conforming to the principles enunciated in paragraphs **78** and **80**, the mounted rank putting their animals into a slow trot. On account of the confusion likely to ensue from executing this movement in a mixed command, the same should only be employed where circumstances render rapidity of movement imperative.

To Halt.

541. Being in march, to arrest the movement: 1. **Platoon,** 2. **HALT.**

Executed by dismounted rank in accordance with paragraph **87**; by the mounted rank as prescribed in paragraph **289.**

To March to the Rear.

542. 1. **Right (Left) about,** 2. **MARCH.**

At the second command the leading section changes direction to the right in accordance with principles laid down in paragraph **109**, moves two paces forward in the new direction and again changes direction to the right. The succeeding sections each in turn conform to the movements of the first, executing identical movements on the same ground. The mounted men follow in column, each pair executing two changes of direction at the proper time as prescribed in paragraph **298.**

To March Obliquely.

543. 1. **Right (Left) oblique,** 2. **MARCH.**

Executed simultaneously by the sections in accordance with the principles of paragraph **108.** Executed by the mounted men as prescribed in paragraph **289.**

To resume the original direction: 1. **Forward,** 2. **MARCH.**

Executed as explained in preceding paragraphs.

To Change Direction.

544. Being in column: 1. **Column right (left),** 2. **MARCH.**

Executed by each section successively according to principles of paragraph **109.**

The mounted men follow in column, each pair executing the change of direction at proper time as prescribed in paragraph **293.**

Half changes of direction are executed in accordance with the same principles substituting the command: **Column half right (left).**

To Form Column to the Front from Line.

545. Being in line: 1. **Right by section,** 2. **MARCH.**

The right section moves straight to the front; the other sections execute section right, column left, and follow the leading section.

The mounted men move out at the proper time to take their places in column by the shortest practicable route.

This movement is only executed from the right.

To Form Line to the Front from Column.

546. Being in column: 1. **Left front into line,** 2. **MARCH,** 3. **Platoon,** 4. **HALT,** 5. **FRONT.**

At the second command the leading section moves straight to the front, each of the succeeding sections oblique to the left, and when opposite its place in line resumes original direction of march. The sections halt on arrival on the line and dress to the right without command.

The mounted men move to their places in line by the shortest practicable route.

The fifth command is given after the completion of the alignment of both dismounted and mounted ranks.

This movement is only executed toward the left.

The Double Column.

547. Being in column: 1. **Double column,** 2. **MARCH.**

At the second command the two leading sections stand fast if at a halt or halt if in march. The third and fifth sections oblique to the left and halt abreast of the second and fourth, respectively. The fourth section closes to normal distance on the second.

The mounted men close to normal distance on the sections and halt.

This movement is only used in route marches to economize road space and no other movements, except those connected with conduct of the march, are contemplated until the column formation is again resumed.

548. Being in double column, to form column: 1. **Column,** 2. **MARCH.**

At the second command the two leading sections take up the march if at a halt; if marching they continue the march. All the other sections and mounted men stand fast or halt as the case may be. The third and fifth sections oblique to the right in time to follow the second and fourth respectively. The fourth section moves forward to follow the third.

The mounted rank takes up the march in time to follow in rear of the dismounted rank at the proper distance.

The Single Column.

549. Being in column: 1. **Single column,** 2. **MARCH.**

At the second command all stand fast or halt if in march, except the right man of the leading section. The left leading man obliques to the right in time to follow the leader at the shortest practicable distance. The single column is formed successively by the other sections in accordance with similar principles, each section following its predecessor as closely as possible.

The mounted rank forms column files in the most convenient manner so as to follow at normal distances in rear. The order of this column is mule drivers in order of sections in column and mounted men in same order as in column.

The single column is only used to pass obstacles or to traverse terrain where other formations are unsuitable. No maneuvers of the platoon except those directly connected with the conduct of the march are contemplated in this formation.

550. Being in single column, to form column: 1. **Column,** 2. **MARCH.**

At the second command the leading man stands fast or halts if in march. The several sections are formed successively in column by the proper men obliquing to the left; the sections successively close to normal distances on the leading section and halt.

In the mounted rank, the mule drivers close to normal distance and halt; the mounted men oblique to the right and halt in their proper positions abreast of the drivers.

To Align the Platoon.

551. The platoon being in line at a halt: If the section on the side toward which the alignment is to be made is not in proper position, the platoon chief establishes it in the position desired, and commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT**. Executed by the dismounted rank according to the principles laid down in paragraphs **95–99** and **140.**

Executed by the mounted rank in accordance with principles laid down in paragraphs **187** and **284**, the mounted man on the side toward which the alignment is prescribed establishing himself accurately in his position 2 yards in rear of the dismounted rank.

The platoon chief aligns each rank separately, commencing with the dismounted rank, taking position for this purpose in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made. After commanding **FRONT**, he resumes his post.

552. The alignment of the platoon in column is conducted on similar principles. In this case the platoon chief, in addition to aligning the several ranks, sees that the men column cover accurately in file.

To Open and Close Ranks.

553. Being in line at a halt: 1. **Open ranks**, 2. **MARCH**, 3. **FRONT**.

Executed by the dismounted rank in accordance with the principles of paragraph **142**, so far as applicable.

The mounted men rein back the animals so as to be 2 yards in rear of dismounted rank in its new position.

The platoon chief aligns the three ranks successively from the front, taking similar positions to those prescribed for dressing the platoon.

The command **FRONT** is given by the platoon chief after having aligned the ranks and taken position facing to the left 4 yards in front of the dismounted rank directly in front of the right file. The platoon chief then turns his horse to the front.

554. Being in open ranks: 1. **Close ranks**, 2. **MARCH.**

Executed by the dismounted rank in accordance with principles of paragraph **143.**

The mounted rank closes to normal distance.

The platoon chief takes his prescribed post in line.

Route Order and At Ease.

555. Marching in any formation: 1. **ROUTE ORDER**, or 1. **AT EASE.**

Executed as prescribed in paragraphs **144** and **191.**

In route marches the platoon chief habitually marches on the leeward side of his platoon opposite the leading mounted man of the platoon.

TECHNICAL OPERATION.

556. The technical operation of the outpost platoon occurs, in general, while it is a detached unit. Possible cases may arise where the platoon will operate in conjunction with other signal units, but they will be of such rarity as to be regarded as highly exceptional. It may be stated, therefore, as a guiding principle that the outpost platoon functions as a unit in a limited, but nevertheless distinct, sphere of operations.

557. As before stated, the composition of the platoon is based upon furnishing efficient telephonic communication within the infantry brigade in combat. The term combat applies to all phases of the same, whether it be offensive or defensive, active or passive. It can hardly be doubted that the character of the organization and of its equipment is such as will readily lend itself to the supply of lines of information in many other situations besides that for which it was primarily designed. In fact, in practically all cases where troops in active operations are not in constant motion the outpost platoon can and should be utilized to advantage.

558. Ordinarily the platoon should be detached from its company and directed to report to the unit, usually an infantry brigade, to which it is assigned for information service, as soon as conditions pointing to early probable use obtain. As soon as practicable after reporting for service, the platoon commander should thoroughly acquaint himself with the local situation. He should keep in constant touch with developments and be prepared at a moment's notice to lay any or all section lines in accordance with a prepared scheme and one best suited to the terrain to be covered.

559. On receiving an order to lay certain lines of information, a position for the switchboard will be first selected. This position should generally be in rear of the center of the chain of outlying stations. If at all practicable, the combat transportation and the platoon personnel should be conducted intact to the switchboard station before commencing work. Whether this procedure can be followed or not depends entirely on local conditions and the decision at what point the platoon is to begin operations should be decided by its commander forthwith.

560. There are no specific commands for the technical handling of the platoon. On arrival at the point where wire laying is to commence the platoon chief gives such directions to the various section chiefs as are necessary for each to work rapidly and intelligently in conformity with the general plan. The technical equipment of the headquarters and switchboard sections is unpacked and turned over to the personnel of these sections. The switchboard section establishes the board at the designated location and the headquarters section at once connects it with general headquarters. At the same time the three telephone sections, or as many as may be designated, proceed to lay wire to connect their several assigned stations to the board and thus effect intercommunication throughout the system.

561. All stations, including the switchboard station, should be selected so as to be secure from the view and fire of the enemy. On the other hand, the telephone sections should be located as close and constantly keep as close as possible to the commander of unit for whose use they are installed. The fact that the telephone is an instrument for the commander's personal use should never be lost sight of. It will be frequently difficult to reconcile the two above conditions, but the same should be done whenever possible.

562. The laying of the lines should always be done with a view to successful maintenance. They should be as short and direct as is possible consistent with security from hostile view and fire. They should avoid, if practicable, crossing or traversing routes of probable use by line troops. If this be impracticable, arrangements should be made for their protection at these points. When the lines are in service the operators will be constantly "on" their instruments, and trouble of any kind should be detected almost coincident with its occurrence. Immediate effort should be made by all concerned to effect its early removal.

563. Cases will no doubt arise where the use of the switchboard will be unnecessary or inadvisable. These cases should be readily apparent to the platoon chief, and necessary orders should be given to lay independent lines.

564. The telephone stations keep intimate contact with their unit commanders at all times. The general procedure in operating the line will be to have the telephone operator send a call for the individual wanted to come to the telephone. The matter of time makes short distances imperative. All communications over outpost lines should be by personal conversation of the officers concerned. Any other method of transmitting information over telephone lines is unnecessarily slow, generally inaccurate, and frequently dangerous.

565. The personnel of the station sections should be intimately acquainted with the several unit commanders and their staffs. This is necessary in finding their proper locations when initially laying the line, and especially so, if, as will frequently be the case, the exact location of the unit to be connected is in doubt. Unless this personal element obtains valuable time may often be lost by failures to find the proper headquarters, in taking erroneous routes, and causing wire to be recovered and relaid.

566. When a change in the system is necessary, the platoon chief will give directions how the same shall be effected. Minor changes can usually be made by lengthening or shortening one or more lines in use. In extended changes it will probably be best to recover all wire, assembling the platoon at the switchboard, and project an entirely new system in accordance with the new plan.

567. The improvised expedients possible with the outpost platoon are innumerable. In no branch of signal work will the resourceful officer find a larger field than in this work; in no branch will practical experience be of more value.

568. Uninterrupted communication between the units, despite all conditions, is the goal to be striven for, and the subaltern who attains it will have found that he has solved a problem more difficult than those which usually confront far higher commanders.

SECTION III.—THE SECTIONS.

TYPES OF SECTIONS.

569. The outpost platoon is composed of five sections, namely, one headquarters section, one switchboard section, and three telephone sections.

570. The headquarters section does not derive its name from the fact that it is the headquarters of the platoon, for such is by no means the case. It is so termed because its normal station is at the brigade or other unit headquarters to which the platoon is attached.

571. The switchboard section derives its name from the character of duty it is designed to perform. The operation and maintenance of the switchboard is its primary function. In addition, it performs such duties of line maintenance as may be necessary.

572. The telephone sections are so called because they are normally designed to operate the telephone stations at the several subsidiary units. In addition, they install and maintain the lines necessary between their variously assigned stations and the switchboard.

THE HEADQUARTERS SECTION.

573. The personnel consists of one sergeant, chief of section (mounted), one private, first class, lineman (mounted), and two privates, first class, telephone operators.

574. The technical equipment includes one telephone, one breast reel, and one half-mile outpost wire, together with certain miscellaneous articles necessary for the installation and maintenance of the line and the operation of one telephone station.

575. The mounts of the section constitute a properly located reserve calculated to afford rapid assistance to any of the other sections wherever occasion should require it.

576. The specific duties of the various individuals of the section are generally described by the character of their titles. In general all perform any duties necessary to rapid and efficient transmission of information. This includes any necessary messenger service in connection with the operation of the line, provided the same can not be promptly performed by other troops.

577. The small amount of wire assigned to this section presupposes that the length of line between unit headquarters and the switchboard will be very short. It is not expected that it will ordinarily exceed a few hundred yards. For this reason, the headquarters and switchboard sections will frequently be able to perform their combined duties as a single group, this permitting a large platoon reserve for the support of other sections of the line, if same should be required.

THE SWITCHBOARD SECTION.

578. The personnel consists of one corporal, chief of section, two privates (first class), switchboard operators, and one private (lineman).

579. The technical equipment includes one field switchboard and such miscellaneous articles as are necessary for the operation of the switchboard station and the maintenance lines contiguous thereto.

580. There are no mounts or pack animals attached to this section, and it is not expected to lay wire. On account of its position, one having direct access to all lines, it will be peculiarly susceptible to the early location of line trouble in the system, and prompt attention should be given in every instance toward removing it.

581. The specific duties of individuals are, as with the headquarters section, generally described by the character of their titles. In general the duties of the entire section are embraced under two heads, namely, the operation of the switchboard and the prompt removal of trouble occurring on any radiating line. Duties will be performed by various members of the section in such a way as to best accomplish these ends.

582. The location of the switchboard is of primary importance in the installation and operation of the line. This will be always done, if at all practicable, by the platoon chief. He takes into consideration the tactical situation, the features of the terrain, and the present, and probable future, positions of headquarters and the various subordinate units to be connected. The possession of a good map and a position affording a clear view of the surrounding country are indispensable requisites to the intelligent selection of this position.

THE TELEPHONE SECTIONS.

583. These sections are designed to furnish lines and telephone stations for three subordinate unit headquarters by connecting same to general headquarters through the switchboard. The personnel, matériel, and transportation of the telephone sections are identical.

584. The personnel of a telephone section consists of one corporal, chief of section; one private, first class, telephone operator; one private, first class, lineman; and one private, lineman. The latter, in addition to his other duties, acts as packer and mule driver.

585. The matériel of the section consists of one telephone, one breast reel, and 2 miles of outpost wire, together with certain miscellaneous articles necessary for the installation and maintenance of the line, and the operation of one telephone station.

586. The platoon combat transportation, the three pack mules, is habitually attached to the three telephone sections. These animals will transport the entire technical equipment of the platoon until the commencement of active operations. At this time matériel belonging to the headquarters and switchboard sections will be removed from the packs and transferred to the personnel of these sections. Thereafter one pack animal will accompany each telephone section to its assigned station and remain with it throughout action, unless good reasons exist for the contrary.

587. As with the other sections, the character of duty performed by the individuals of the telephone section is indicated by their titles. In general the duties performed by the members of the section are similar to those prescribed for members of the headquarters section.

588. Each telephone section is expected to install and maintain a line from the switchboard to a certain designated subordinate unit headquarters, and to operate a telephone station thereat. To effect this connection the wire furnished is expected in all ordinary cases to be ample for this purpose. The section will follow with its line all movements of the headquarters to which attached, keeping intimate connection therewith and utilizing its own wire as far as possible. Where necessary and practicable, improvised lines will be employed. Frequent reports will be made by chiefs of sections to the platoon chief as to location of the section station, amount of unused wire on hand, anticipated movements, and the practicability of employing existing lines for purposes of communication.

589. So far as is practicable, after a section station is once opened, the lines of the telephone sections will be kept in constant communication with switchboard. In changing the location of the station timely arrangements should be made for extending the line and the telephone removed therefrom only for the shortest time compatible with removal to the new site.

SECTION IV.—THE COMPANY.

FORMATION OF THE COMPANY.

590. The habitual formations are: The **order in line, the order in section column.**

591. The **order in line** is that in which the platoons, each in column of sections, are formed abreast of each other in their numerical order or the reverse order from right to left. The interval between the platoons is 27 yards.

592. The order in section column is that in which the platoons, each in column of sections, follow each other in their numerical order or the reverse order, from front to rear. This distance between the platoons is 4 yards.

POSTS OF INDIVIDUALS.

593. The captain in the order in line is 8 yards in front of the company opposite its center. In the order in section column, he is opposite its center and 16 yards from the flank. In column the captain is on the left when the first platoon leads and on the right when the column is reversed.

The platoon chiefs in both formations are posted 4 yards to the left and abreast of the leading file of their platoons.

The first lieutenant not commanding a platoon, the first sergeant, and master signal electrician occupy similar positions in both formations with reference to the first, second, and third platoons, respectively. Each is posted on the right flank of the respective platoon, opposite the center and 2 yards therefrom.

The guidon in line is abreast of the leading rank of the company and 2 yards from the flank toward which the guide has been announced; in section column abreast of and 2 yards to the right of the leading rank of the leading section.

The buglers, or bugler not acting as guidon, follow 2 yards in rear of the captain.

The dismounted men attached to company headquarters do not take part in company maneuvers, except when assigned to duty in platoons. Otherwise they are present only with field and combat transportation, taking such posts with it as are assigned them by the captain.

MANEUVER.

General Rules.

594. The rules for the maneuver of the platoon apply to the company.

595. The guide of the company in line is the guide of the platoon on the side of the guide. In section column it is the guide of the leading platoon.

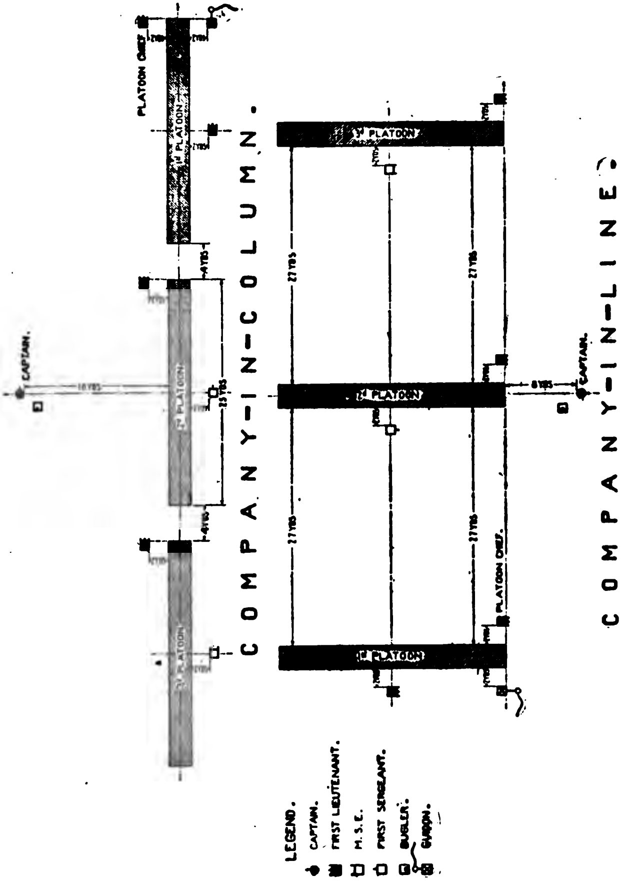


PLATE 9.—THE OUTPOST COMPANY.

596. During an oblique march the guide of the company is, without indication, the guide of the platoon on the side to which the oblique is made.

597. The guidon conducts himself as prescribed for maneuver of wire or radio companies.

598. In all maneuvers resulting in a formation in line the company is either halted at the completion of the formation, or the guide is announced if the march is to be continued.

599. Platoon chiefs repeat such preparatory commands as are to be immediately executed by their platoons. They give only such commands of execution as are necessary to cause their platoons to function properly in company maneuver.

To Form the Company.

600. The company is formed dismounted by the first sergeant after which he commands: **By platoon, FALL OUT.** The procedure outlined in paragraph **587** is followed by each platoon. Each platoon is then minutely inspected by its assistant chief.

The first sergeant forms the company in line and takes his post.

Each platoon chief, having received the report of his assistant platoon chief, makes a general inspection of his platoon and commands: **REST.**

Upon the approach of the captain the platoon chiefs call their platoons to attention, and as soon as the captain takes his place in front report in succession from right to left: **(SUCH) PLATOON IN ORDER, SIR**; or if anything is missing or out of order they so report.

As soon as the platoon chiefs have reported, the first sergeant reports to the captain as prescribed in paragraph **139.**

The lieutenant not assigned as platoon chief and the master signal electrician take their posts on the approach of the captain.

To Dismiss the Company.

601. The captain commands: **DISMISS THE COMPANY.**

The lieutenants and master signal electrician fall out. The first sergeant takes charge of the company and commands:

By platoon, FALL OUT. The platoons are then dismissed as prescribed in paragraph **538.**

To Align the Company.

602. The company being in line at a halt.

If the platoon on the side toward which the alignment is to made is not in proper position, the captain establishes it in the position desired and commands: 1. **Right (left),** 2. **DRESS,** 3. **FRONT.**

At the command **DRESS,** the other platoons move forward or backward, the leading dismounted rank aligning itself toward the right; both dismounted and mounted men turn their heads to the right and dress on the corresponding elements in the platoon on their right.

The captain aligns the leading dismounted and mounted ranks of all the platoons, taking position for this purpose in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made. After commanding **FRONT,** he resumes his post.

To March to the Front.

603. Being at a halt: 1. **Forward,** 2. **MARCH.**

Executed simultaneously by all the platoons as prescribed in paragraph **539.** All the platoons move straight to the front, taking care to maintain their proper relative positions in the formation.

604. The principles of paragraph **540** relative to movements in double time in the platoon apply to the company.

To Halt.

605. Being in march: 1. **Company,** 2. **HALT.**

Executed by each platoon as prescribed in paragraph **541,** all platoons stopping simultaneously but not suddenly.

To March to the Flank.

606. 1. **By the right (left) flank,** 2. **MARCH.**

Executed simultaneously by each platoon making a change of direction as prescribed in paragraph **544.**

To March to the Rear.

607. 1. **Right (left) about,** 2. **MARCH.**

Executed simultaneously by each platoon as prescribed in paragraph **542.**

To March Obliquely.

608. 1. **Right (left) oblique,** 2. **MARCH.**

Executed by each platoon as prescribed in paragraph **543.**

To Change Direction.

609. Being in column: 1. **Column right (left),** 2. **MARCH.**

Executed successively by the platoons in accordance with paragraph **544**, each platoon chief giving the command for his platoon to change direction on the same ground as the one preceding it.

610. Being in line: 1. **Company right (left),** 2. **MARCH,** 3. **Company,** 4. **HALT.**

The right platoon changes direction to the right, the other platoons are conducted by the shortest line to their places abreast of the first.

The fourth command is given when the right platoon has advanced the desired distance in the new direction; that platoon halts; the others halt successively on arriving on the line.

To Close or Extend Intervals.

611. 1. **On (such) platoon,** 2. **To (so many yards),** 3. **Close (extend) intervals,** 4. **MARCH,** 5. **Company,** 6. **HALT.**

The indicated platoon moves straight to the front, the other platoons oblique toward or away from the indicated platoon, and move to the front when at proper interval.

The sixth command is given when the directing platoon has advanced sufficient distance to permit the proper execution of the movement by the other platoons; it halts; the other platoons halt successively on arrival in line.

To Form Column from Line.

TO THE FRONT.

612. Being in line: 1. **Right (left) by platoon.** 2. **MARCH.**

The right platoon moves straight to the front marching; if at a halt it takes up the march. The other platoons, in turn, execute column right and follow in column at 4 yards distance.

TO THE FLANK.

613. Executed as prescribed in paragraph **606.**

To Form Line from Column.

TO THE FRONT.

614. 1. **Right (left), front into line.** 2. **MARCH;** 3. **Company,** 4. **HALT.**

The leading platoon moves straight to the front. Each platoon in rear executes column half right. When opposite its place in line it executes column half left and moves to its place in line.

The fourth command is given when the directing platoon has advanced the desired distance; it halts; the other platoons halt successively on arrival at their places in line.

TO THE FLANK.

615. 1. **On right (left), into line.** 2. **MARCH;** 3. **Company,** 4. **HALT.**

The leading platoon executes column right and moves straight to the front in the new direction. The platoons in rear continue to march straight to the front; each passes beyond the platoon directly preceding it, and when opposite the right of its place executes column right and proceeds to its place in line.

The fourth command is given when the directing platoon has advanced the desired distance in the new direction; it halts; the other platoons halt on arrival successively at their proper places in line.

616. 1. **Right (left) into line,** 2. **MARCH;** 3. **Company,** 4. **HALT.**

The leading platoon executes column right and moves straight to the front in the new direction. The platoons in rear continue to march straight to the front until each is at the right of its place in line, at the prescribed interval from the preceding platoon; each then executes column right and proceeds to its place in line.

The fourth command is given when the directing platoon has advanced the desired distance in the new direction; it halts; the other platoons halt successively on arrival at their places in line.

This movement is intended to be used to form line with contracted intervals and therefore the interval between platoons desired should be interpolated in the preparatory command.

The Double Column.

617. Formed simultaneously by each platoon as prescribed in paragraphs **547** and **548.**

The platoon chiefs of the rear platoons close their platoons on the preceding element as soon as the double column is formed.

The Single Column.

618. This movement is not usually executed by the company. If desired, however, it can be executed as prescribed in paragraphs **549** and **550.**

To Form the Platoons in Line.

619. Being in line or column: 1. **Platoons,** 2. **Left front into line,** 3. **MARCH,** 4. **Company,** 5. **HALT,** 6. **FRONT.**

Executed at the third command simultaneously by each platoon as prescribed in paragraph **546.**

The lieutenant not commanding a platoon, the first sergeant, and the master signal electrician take post 4 yards in rear of the center of the respective platoons.

The sixth command is given after the completion of the alignment of the dismounted and mounted ranks of the company.

This movement is only executed to the left.

To Form Line or Column.

620. 1. **Platoons**, 2. **Right by sections**, 3. **MARCH.**

Executed simultaneously by each platoon as prescribed in paragraph **545.**

This movement is only executed from the right.

To Open and Close Ranks.

621. Being in line, or in column, with platoons in line at a halt: 1. **Open ranks**, 2. **MARCH**, 3. **FRONT**.

Executed by each platoon simultaneously as prescribed in paragraph **553.** The file closers conform.

The captain aligns the ranks of the company successively from front to rear from similar positions to those described for dressing.

The command **FRONT** is given by the captain after having aligned all the ranks and taken position facing to the left 4 yards in front of the dismounted rank of the right or leading platoon, and directly in front of its right file. The captain then turns his horse to the front.

622. Being at open ranks: 1. **Close ranks**, 2. **MARCH.**

Executed simultaneously by each platoon as prescribed in paragraph **554.**

Route Order and at Ease.

623. Executed as prescribed in paragraphs **144** and **191.**

In route marches, the captain marches 8 yards in front of the leading element, followed at 2 yards by the bugler and guidon, the latter on the right. Platoon chiefs march as prescribed in paragraph **555.** File closers march where the captain directs. The company instrument wagon marches in rear of the column.

SECTION V.—EMPLOYMENT IN THE FIELD.

624. The employment of the outpost company in the field includes the functioning of its several platoons in performing such duties as may be directed by the field battalion commander.

625. The detachment of any element or elements of the company when necessity for the same arises, occurs at the direction of the battalion and by the order of the company commander. The company, at all times, acts as administrative headquarters for all of its units whether attached or detached. This matter will be attended with some difficulty if the units be widely scattered as may frequently happen. The procedure is inevitable, however, from the fact that the company functions wholly in the dispersion of its elements.

626. Besides the conduct of administration, the company headquarters will furnish such assistance to the working units as may be necessary for the efficient performance of their duties at all times and under all circumstances.

627. Detached signal units usually mess with line troops with whom they are assigned for duty. Where this method is for any reason impracticable, necessary arrangements for separate subsistence must be made by the company, if necessary, assisted by the battalion commander.

628. Company headquarters assists the several detached platoons by furnishing such reserve personnel and matériel as may be practicable.

The limited quota of company headquarters will necessarily restrict the number of reserve personnel which at any time can be spared for detachment therefrom.

629. Some reserve personnel, however, can and should be supplied by it, if called upon. Moreover, if all the working units are not detached at the same time, provision can be made to temporarily reenforce active units from those inactive. As the platoon and the several sections therein are made large enough to furnish their own reserves, depletion beyond the safety limit should be discovered in ample time to requisition and secure the needed reserve personnel from the nearest point at which they are readily obtainable. Furthermore, the temporary presence of one or more of the specially skilled members of the headquarters staff, such as the horseshoer or saddler, will not infrequently be of incalculable benefit if promptly supplied to detached units when needed. Close touch should, therefore, be had at all times with the working units looking to the supply of this character of aid if the same should be required.

630. A reasonable amount of reserve matériel is carried upon the company instrument wagon. This matériel includes not only a reserve supply of all matériel used by the outpost platoon, but in addition, extra tools and certain special articles, the need for which, while infrequent, is at times imperative. The need for any of this matériel should be readily and quickly apparent at company headquarters through unfailing channels of contact with its working units, and no delay should be permitted in proper supply.

631. The technical operation of the working units is described under the platoon. The general function of the company is the support, maintenance, and, when necessary, the coordination of the work of these units when employed in the service of information.

CHAPTER V.—THE FIELD BATTALION.

ORGANIZATION OF THE BATTALION.

632. The headquarters of a field battalion consists of the following:

One battalion commander (major).
One battalion adjutant and supply officer (first lieutenant).
One sergeant major, assistant to the adjutant (sergeant, first class).
One clerk (sergeant).
One color sergeant (sergeant).
Four orderlies (privates, first class).
One driver, for shop wagon (private, first class).

The supply detachment of a field battalion consists of the following:

One battalion supply sergeant (sergeant, first class).
Five drivers, for field train wagons (privates, first class).

POSTS OF INDIVIDUALS.

633. At ceremonies the major is 30 yards in front of his battalion, opposite the center. On other occasions he places himself where he can most readily observe and direct his battalion. The commissioned staff is posted 2 yards in rear of the major; the noncommissioned staff and the orderlies, similarly formed, 2 yards in rear of the commissioned staff. The supply detachment is with the field train.

FORMATION OF THE BATTALION.

634. The normal formations of the battalion are the **order in line** and the **order in section column.**

635. In the **order in line** the companies of the battalion, each in the order in line are formed abreast of each other in the order, from right to left, outpost company, wire company, and radio company. The interval between companies is 30 yards. If the battalion be formed with closed intervals, the interval between companies is 15 yards.

636. In **the order in section column** the companies of the battalion, each in the order in section column, follow each other in the order given in paragraph **635**, above. The distances between companies are such as would result from the companies moving simultaneously by the flank from the order in line.

TO FORM THE BATTALION.

637. To form the battalion in line, the adjutant causes adjutant's call to be sounded; the adjutant and sergeant major proceed to the selected ground and post themselves facing each other a few yards outside the points where the right and left of the right company of the battalion are to rest.

The companies approach the line from the rear and are posted in succession from right to left by their captains, so that the front rank will be on the line established by the adjutant and sergeant major. After halting his company, each captain aligns it toward the right.

When the company that arrives first on the line has been established, the sergeant major joins the battalion noncommissioned staff.

The line being formed, the major and his staff take post, facing the center of the battalion. The adjutant then moves at a trot or gallop by the shortest line to a point midway between the major and the center of the battalion, halts, facing the major, salutes and reports: **Sir, the battalion is formed.**

The major returns the salute.

The adjutant then takes his post with the battalion staff.

638. The battalion may also be assembled in any other convenient formation. In such cases, as soon as the last company has taken its place the adjutant joins the major and reports to him that the battalion is formed.

639. Officers draw and return saber with the major. At ceremonies, sabers are habitually drawn; at other times, they are drawn or kept in the scabbard at the discretion of the major.

TO ALIGN THE BATTALION.

640. To effect a general alignment the major causes one of the flank companies to be established in the desired positon, and commands: 1. **Right (left),** 2. **DRESS.**

Each captain in turn, commencing with the company first posted, aligns his company toward the flank designated, and commands **front** when the alignment is complete.

The captain of the company first established superintends the alignment from the flank of his company nearest the point of rest. The captains of the other companies superintend the alignment from the flank of their companies farthest from the point of rest.

TO DISMISS THE BATTALION.

641. The major commands: **Dismiss your companies,** or sends appropriate instructions to the captains. Each captain marches his company to its park and dismisses it.

MANEUVERS OF THE BATTALION.

642. Formal maneuvers of the battalion are of limited application.

For passing from one formation to another, and for the simple evolutions requisite for ceremonies and the ordinary incidents of service, the battalion is maneuvered in accordance with the principles heretofore prescribed for the separate companies and by similar commands. In the case of simultaneous movements, such as marching to the front, to the flank, to the rear, or obliquely, the command or signal of execution of the major is immediately repeated by the captains and simultaneously executed by the companies. In the case of successive movements, the captains maneuver their companies so as to cause them to assume their proper positions by the shortest route and in conformity with the principles of the rules of gaits.

643. The commands of the major are transmitted by orderlies or given by arm, saber, or trumpet signals, or by word of mouth. The captains habitually repeat the commands of the major, or give such commands as may be necessary to insure the execution of the movement. Their commands are given by arm or saber signal, or by word of mouth. The whistle, and not the trumpet, is habitually used to attract attention to the signals of the captain during the evolutions of the battalion.

EMPLOYMENT OF THE BATTALION.

644. The field battalion is a technical and an administrative unit. The headquarters and supply detachment concerns itself principally with matters of administration and supply.

645. The tactical function of the battalion is limited to the sum of the functions of the three separate companies in the battalion, as the companies have, in general, separate spheres of action.

646. The major will, however, direct and supervise the training and instruction of the companies in camp and garrison and, will, in the field, direct, supervise, and coordinate the work of the companies in the battalion in a manner calculated to furnish the most efficient service of information possible for the division. Under his direction members of each company will be instructed and trained in the duties pertaining to individuals in the other companies of the battalion.

647. It is probable that the major commanding a field battalion will often serve on the staff of the division commander as division signal officer. When such a situation obtains, he will consider himself the technical adviser of the division commander and of the chief of staff in all matters pertaining to signal corps work. He should enjoy the complete confidence of his commander. He will make timely recommendations as to the employment of the units in the battalion and will take appropriate steps to acquaint the above-named officers with the technical and tactical possibilities and limitations of field signal troops as situations arise. When a number of the division staff, he keeps himself informed as to the state of supply of articles of signal corps equipment in the hands of line troops and arranges for the replacement of these articles from the supply depots in rear.

PART V.

TELEGRAPH SIGNAL TROOPS.

CHAPTER I.—FUNCTION AND EMPLOYMENT.

648. Lines of information may be either strategical or tactical.

649. Strategical lines of information extend from the seat of government to the several divisional headquarters in the field. All lines of information connecting the division headquarters with any of its component parts are tactical. Tactical lines of information are handled by field signal troops; strategical lines by base line or telegraph signal troops, according to circumstances.

650. Strategical lines of information are divided into two zones.

651. The base line or inner strategical zone comprises that portion of the strategical lines of information included between the seat of government and advance base or bases of armies in the field. Information duties pertaining to this zone are handled by base line signal troops.

652. The telegraph or outer strategical zone embraces that portion of the strategical lines of information included between the advance base or bases of armies in the field and the several divisional headquarters. Information duties pertaining to this zone are handled by telegraph signal troops. In addition, these troops are designed to furnish certain administrative lines of information in the shape of camp telephone systems for the larger units in the field whenever circumstances render the same necessary or advisable.

653. The duties of telegraph signal troops, although only equipped to install and operate semipermanent telegraph and telephone lines, include the handling of every class of communication within their prescribed zone. Whenever the installation or operation of radio or cable systems or any other form of communication becomes necessary within the telegraph zone necessary additions to the personnel and matériel of the troops will be made to accomplish the purpose in hand.

634. On advance the telegraph zone, or a portion of it, will generally become merged into the base line zone. In this case an adjustment of the duties of base line and telegraph signal troops will be necessary. Provision should, if practicable, be made for this beforehand, and the working of these classes of troops, each within its proper zone, now included between new points on the terrain, should be established as rapidly and with as little confusion as possible.

635. On retirement reverse conditions to advance will generally obtain. A portion of the base line zone (a new telegraph zone) will be surrendered by the base line to the telegraph troops for operation and maintenance.

636. Cases will, no doubt, frequently arise where base line and telegraph troops will be compelled to operate, for a time at least, in a zone to which they are not normally assigned. As soon as practicable, however, changes should be effected to cir- [illegible] within the properly defined boundaries.

637. Telegraph signal troops, although construction units, are designed to be mobile. For this reason only a limited [illegible] of construction and operation material is supplied as their equipment. Their capability for construction work is, however, unlimited, provided the requisite material be furnished. Installations of this kind can usually be anticipated and preparation should be made [illegible] practicable, to supply what [illegible] use.

638. Telegra[illegible] the proper [illegible] more telegr[illegible] army corp[illegible] number, [illegible] as necess[illegible]

CHAPTER II [illegible]

[illegible]

659. The [illegible] operate, trative unit in the [illegible] Under [illegible] within Its employment [illegible] men to situation and [illegible] men, with or the entire [illegible] nical will line as may be [illegible] company [illegible] installed, time, as in [illegible] or it may organization [illegible] ready in posi- [illegible] daily con- [illegible] rtation. In [illegible] of line, the [illegible] line in such [illegible] ection is ex- [illegible] all conditions.

660. The [illegible] headquarters [illegible] the four [illegible] phone sections [illegible] may consist of [illegible] may consist of [illegible] cumstances [illegible] supervision of his

For the [illegible] panies are [illegible] both telegraph [illegible] indicated by his [illegible] possible [illegible] of line. At other allow [illegible] may be assigned to

661. The [illegible]

1 captain [illegible] tion or maintenance

2 first lieutenants [illegible] or operating line.

3 [illegible] operate their stations

1 [illegible] they perform such line [illegible] the chief of section.

[illegible] line as may be necessary [illegible] on.

[illegible] as may be necessary in in- [illegible]

[illegible] duty transporting men or [illegible] cars as they may be directed [illegible] th installation and maintenance.

DUTIES OF INDIVIDUALS.

[illegible] captain, lieutenant, [illegible] supply sergeant, [illegible] and messengers [illegible] field com[illegible]

[illegible] charge of motor [illegible] efficient [illegible] work to [illegible] duties he [illegible]

[illegible] mechanic.

[illegible] working order of [illegible] and ad[illegible] handling of [illegible]

[illegible]

[illegible]

[illegible] the work[illegible] or bat[illegible] combined [illegible] section are [illegible] supervision and [illegible]

[illegible]

[illegible] first [illegible]

[illegible] movements.

[illegible]

ORGANIZATION AND EQUIPMENT.

664. The section is organized and equipped to install, operate, and maintain 20 miles of semipermanent telegraph line. Under ordinary conditions this installation should take place within one working day.

The transportation furnished permits from four to six men to ride upon motorcycles or side cars. The remaining men, with all personal baggage, and the prescribed section technical will be carried upon the section trucks.

After all material carried by the section has been installed, it may be called upon to build other sections of line or it may be called upon to operate the section or sections already in position. In the former case, additional material for daily construction work must be supplied by other transportation. In case of the operation and maintenance of a section of line, the personnel of the section will be distributed over the line in such a manner as will best facilitate this work. The section is expected to be a self-sustaining unit under any and all conditions.

DUTIES OF INDIVIDUALS.

665. The chief of section exercises general supervision of his section at all times.

The chief operator exercises the function indicated by his title when the section is operating a section of line. At other times he performs such special duties as may be assigned to him by the chief of section.

The chief lineman supervises construction or maintenance work according as the section is installing or operating line.

The operators (two for each station) operate their stations when installed. During installation they perform such line work as may be assigned to them by the chief of section.

The linemen install or maintain the line as may be necessary under the direction of the chief lineman.

The drivers operate their trucks as may be necessary in installation and maintenance.

The messengers are assigned to duty transporting men or material in the motorcycles or side cars as they may be directed by the chief of section during both installation and maintenance.

NUMERICAL DESIGNATION OF MEMBERS.

666. The men of the telegraph section, except the chief of section, chief operator, and chief lineman are numbered from 1 to 19 for the purpose of prescribing their positions and duties in various drills and formations.

Specifically, they are numbered as follows:

1.	Sergeant, operator.	Operating squad.
2.	Corporal, operator.	
3.	Corporal, operator.	
4.	Private, first class, operator.	
5.	Private, first class, operator.	
6.	Private, first class, operator.	
7.	Corporal, lineman.	Line squad.
8.	Private, first class, lineman.	
9.	Private, first class, lineman.	
10.	Private, first class, lineman.	
11.	Private, first class, lineman.	
12.	Private, first class, lineman.	
13.	Private, first class, lineman.	
14.	Private, lineman.	
15.	Private, messenger.	Messenger squad.
16.	Private, messenger.	
17.	Private, first class, driver.	Driving squad.
18.	Private, first class, driver.	
19.	Private, first class, driver.	

C. S.—Chief of section.
C. O.—Chief operator.
C. L.—Chief lineman.

667. The above division into squads has for its purpose only the general grouping of individuals commonly expected to perform similar duties. In forming the section the individuals are so arranged as to preserve the integrity of the squads. In the performance of technical work the men are assigned to duty without reference to original grouping whenever rapidity and efficiency can be gained thereby.

FORMATION OF THE SECTION.

668. The section is formed in line in double rank with the odd numbers in the rear rank and even numbers in the front rank. The chief of section is 2 yards in front and center of his section, the messengers and drivers in the line of the file closers.

POST OF INDIVIDUALS.

669. Positions of all individuals are as shown in Plate 10.

DISTRIBUTION OF MATÉRIEL FOR TRANSPORT.

670. The assignment of matériel to the several carriages for transport is such that each carriage, with its assigned personnel, will have approximately its maximum load. The distribution of personnel and matériel is also planned so as to have these readily available for construction work.

Specifically, the section carriages are loaded as follows:

Truck No. 1: One half the lance poles of the section (300), with insulators for same.

Truck No. 2: Same as truck No. 1, except add digging bars and tamping bars.

Truck No. 3: All wire, tools, station equipment, and other miscellaneous matériel belonging to the section.

The above distribution of matériel is considered normal. It can and should be varied if good reasons for this procedure are apparent.

TO FORM THE SECTION.

671. The section falls in as a dismounted double rank at the order of its chief, who posts himself facing it 2 yards from where the center is to rest. The chief of section then calls the roll or otherwise verifies the personnel, and directs it to call off. He then directs the file closers to fall out and marches the remainder of the section to the storerooms, where the trucks are brought up by their drivers. He then gives the command: **PACK OUT.** The personnel assigned to each truck then proceeds to load the truck, each with its proper technical matériel, under supervision of the ranking noncommissioned officer present with it.

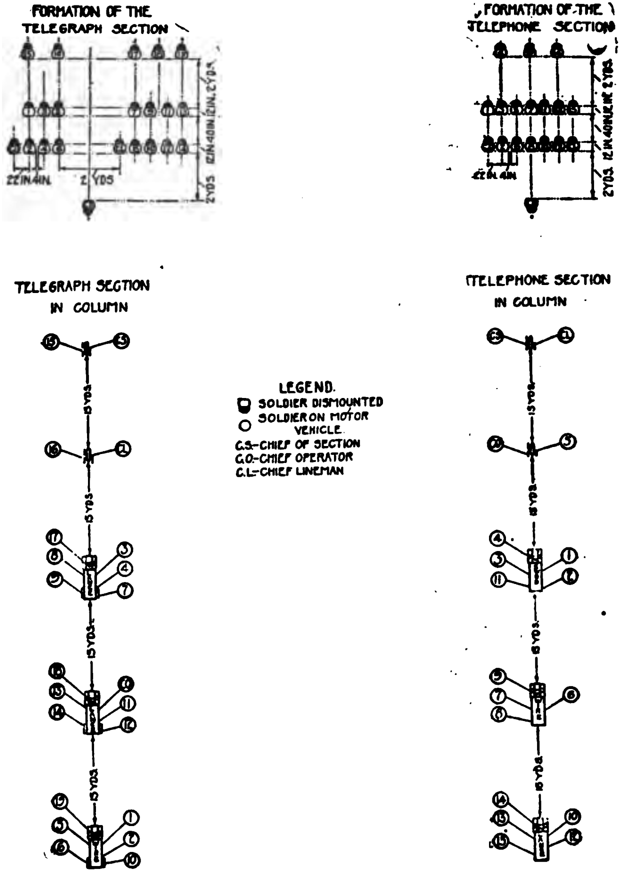
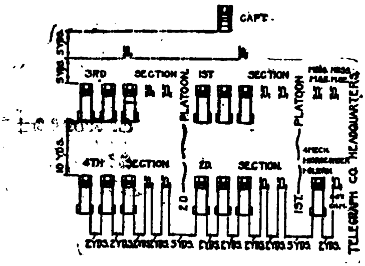

FORMATION OF THE TELEGRAPH SECTION
22 IN. 4 IN.
2 YDS
2 YDS.
12 IN. 40 IN. 12 IN. 2 YDS.
FORMATION OF THE TELEPHONE SECTION
22 IN. 4 IN.
2 YDS. 12 IN. 40 IN. 12 IN. 2 YDS.
TELEGRAPH SECTION IN COLUMN
15 YDS.
TELEPHONE SECTION IN COLUMN
LEGEND.
SOLDIER DISMOUNTED
SOLDIER ON MOTOR VEHICLE
C.S.-CHIEF OF SECTION
C.O.-CHIEF OPERATOR
C.L.-CHIEF LINEMAN

PLATE 10.—THE TELEGRAPH

COMPANY-IN-LINE



LEGEND.

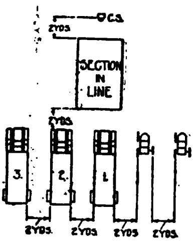
TELEGRAPH SECTION.

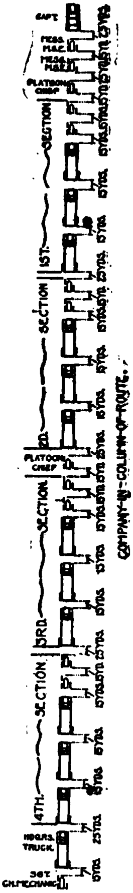
TRUCK NO. 1.—LANCE TRUCK.
TRUCK NO. 2.—LANCE TRUCK.
TRUCK NO. 3.—WIRE TRUCK.

TELEPHONE SECTION.

TRUCK NO. 1.—SWBD. TRUCK.
TRUCK NO. 2.—WIRE TRUCK.
TRUCK NO. 3.—LANCE TRUCK.

SECTION-IN-LINE





COMPANY-IN-COLUMN-OF-ROUTE.

Ordinarily the corporal lineman (No. 7) supervises the loading of truck No. 1; the chief operator, of truck No. 2; and the sergeant operator (No. 1), of truck No. 3.

The trucks being loaded, all carriages are again formed in park, the personnel forming in line 2 yards in front of the center of the carriages.

The chief of section then makes a minute inspection of the equipment, carriages, and personnel and gives such orders or directions as may be necessary.

SECTION MANEUVER.

To Mount and Dismount.

672. The section being dismounted in line, the carriages in any formation, the chief of section commands: **MOUNT UP.**

At this command each driver and messenger mounts his carriage and, unless otherwise directed, starts his motor.

The personnel assigned to the various carriages for transport proceed to them by the shortest practicable route and mount.

673. Being in line at a halt to dismount the section, the chief of section dismounts from his carriage and commands: **DISMOUNT.**

At this command the drivers stop their motors, if running, and all personnel dismount and form in line 2 yards in front of the center carriage.

The section at a halt in any formation may be dismounted according to same principles. In this case the chief of section designates the position where the section dismounted is to form in line.

To Leave the Park.

674. The chief of section signals **forward** and moves out in his own carriage. The remaining carriages follow in the prescribed order of route.

To Conduct the Section En Route.

675. The section marches in the order prescribed.

All drivers observe strictly the rules of the road. Except in emergency, the gait should not exceed 12 miles per hour.

The prescribed distance of 15 yards between carriages is the minimum safe distance at which the carriages should follow each other. Road conditions will frequently make a greater distance necessary or desirable; the section should remain closed to 15 yards as far as the prudent conduct of travel permits.

If the section is to travel any distance alone, one of the motorcycles, preferably No. 2, should march in rear of the column.

To Halt.

676. The chief of section signals **HALT** and stops his carriage. The other carriages halt at 15 yards from the one preceding. The carriages may be directed to close to shorter distances if desired.

To Dismiss the Section.

677. The section being in park and the personnel being mounted on the carriages, the chief of section dismounts and commands: **PACK IN.** At this command the trucks proceed to the storerooms and the matériel is unloaded and disposed of under supervision of senior noncommissioned officer on each truck, generally supervised by the chief of section. The drivers then return their trucks to the park. The chief of section marches the section (less driving and messenger squads) to the parade ground and dismisses it. The chief lineman inspects all carriages and thereafter dismisses the drivers and messengers.

TECHNICAL DRILL.

General Provisions.

678. The lance pole telegraph line is classed as a semipermanent line. It should, however, be erected as carefully and substantially as practicable, with a view to the elimination of line trouble as well as on account of the fact that it can never be foretold just how long the line will have to be operated before being superseded by permanent construction.

679. The technical drill, while minutely described by the exact assignment of duties to the various members of the section, is necessarily but a general guide. The situation will not only vary greatly with establishment of every new section line, but construction will also differ considerably in various parts of any line. The section or other commander should not hesitate to vary from the drill if it appears advisable.

680. Thoroughly substantial construction, completed as rapidly as possible, should be the object sought in the assignment of men, tools, and matériel, and any assignment, as applied to the situation in hand, which best accomplishes this object should be the one employed.

To Prepare to Open Station.

681. On arrival at the point where construction is to begin the chief of section halts the section, dismounts, and directs the carriages to close to 5 yards distance. He then commands: **PREPARE TO OPEN STATION.**

At this command all dismount except the drivers and messengers, and each member provides himself with the proper tools or equipment incident to his employment in line construction. The section is then formed in line by the chief of section, who verifies the men and the individual equipment of each.

To Open Station.

682. The chief of section commands: **OPEN STATION.**

At this command the first station is installed and construction work is begun, the line being erected generally as follows: The insulators are placed upon the poles, which are dropped at points convenient for erecting. Pigtails are placed on all poles except those intended to be guyed. In straight stretches every fifth pole is guyed usually both ways against the line. Poles to be guyed are equipped with pony insulators. Holes to receive the poles are dug at proper points. The wire which has been laid along the route is inserted in the tail of the pigtail and the poles equipped with these insulators are then erected and thoroughly tamped.

The slack is pulled up at every pole equipped with a pony insulator, the tie being made on this pole while on the ground near the hole dug to receive it. This pole is then erected, tamped, and guyed.

683. The duties of each member of the section incident to constructing the line are as follows:

Chief of section: General supervision of construction, including necessary reconnaissance. Utilizes to best advantage men not specifically engaged and in general takes such steps as may be necessary to accomplish as rapid construction as is consistent with stability.

Chief operator: Sees that station property is unloaded at various stations and that same is properly installed. Assigns operators to stations where necessary. Inspects line after erection of same is complete. Replaces broken poles or insulators where necessary, sees that all guys are taut and in general removes any apparent trouble from the line. Covers the line about one-half mile behind tail of construction party in truck No. 2.

Chief lineman: With No. 8 constitutes first erecting squad. Pulls up slack, ties and guy poles at which this procedure is necessary.

No. 1: Remains at station 1 to care for station property and operate station if necessary.

No. 2: Operator station 2. Rides from station 1 to station 2 on truck No. 3.

No. 3: Rides on truck No. 1 and superintends unloading of poles. Sees that poles are properly spaced and provided with insulators of the proper kind. Sees that double or triple poles are unloaded at road crossings and other proper points. Also sees that guys are dropped in sufficient number at points where same will be needed.

No. 4: Accompanies truck No. 1. Fits insulators on poles and unloads same as per directions of No. 3.

No. 5: Rides on truck No. 3 and pays out wire from reel. Attends splices.

No. 6: Assists No. 5 on truck No. 3. Takes first trick as operator at station 3.

No. 7, assistant chief lineman: With No. 9 constitutes second erecting squad. Pulls up slack, ties and guys poles where this procedure is necessary.

No. 8: Duty with first erecting squad.

No. 9: Duty with second erecting squad.

No. 10: Checks tension from a point midway between ties.

Nos. 11, 12, 13, and 14, hole diggers: Dig holes and erect and tamp all poles not tied in.

Nos. 15 and 16, messengers: Relay erecting squads, hole diggers, and No. 10 forward as necessary.

Nos. 17, 18, and 19: Operate the trucks.

To Prepare to Close Station.

684. Before recovering the line the section transportation and a large portion of the personnel should be assembled at the point where recovery is to begin. This point should normally be at one end of the section.

Preparatory to recovering the line the chief of section commands: **PREPARE TO CLOSE STATION.**

At this command the operator on duty at the station sends GB to all stations and gets acknowledgment of same. All members of the section procure necessary equipment to be used in recovering the line and form for inspection as in **prepare to open station.**

To Close Station.

685. To commence recovery of the line the chief of section comands: **CLOSE STATION.**

The line is recovered generally as follows: The poles are taken down, insulators and guys removed and loaded on the designated truck. The wire is reeled up in approximately ½-mile coils and loaded on truck No. 3.

686. The duties of each member of the section incident to the recovery of the line are as follows:

Chief of section: Same as in constructing line.

Chief operator: Sees that station property is loaded on at first and succeeding stations.

Chief lineman: Assisted by No. 8, removes every alternate guyed pole.

No. 1: Operator at first station. No duties except to load and pack station property on truck No. 3 at proper time.

No. 2: Operator at second station. Duties same as No. 1.

Nos. 3 and 4: Assisted by No. 11, load poles, guys, and insulators on truck No. 1.

Nos. 5 and 6: Assisted by No. 10, reel up wire on truck No. 3. Bind up in ½-mile coils and load on truck.

No. 7: Assisted by No. 9, removes every alternate guyed pole.

No. 8: Assists chief lineman.

No. 9: Assists No. 7.

No. 10: Assists Nos. 5 and 6.

No. 11: Assists Nos. 3 and 4.

Nos. 12, 13, and 14: Same as duties Nos. 3, 4, and 11, but with truck No. 2.

Nos. 15 and 16: Relay the squads removing guyed poles..

Nos. 17, 18, and 19: Operate trucks incident to recovery of line.

687. The technical drill of the section is not expected necessarily to cover the normal or usual case in either construction or recovery. It is prescribed as a drill wholly for the purpose of training the section members in their various duties and for the conduct of the work by squads in an orderly and methodical manner.

In construction work where the line is erected on supports other than lance poles, the chief of section makes such changes in assignments of duty of the various section members as will best facilitate the work in hand.

The drill for closing station assumes that the entire section (less 2 operators) is assembled at one end of the line. If such is not the case (and this condition is usually to be expected), the chief of section gives suitable directions and makes such assignments as are necessary to recover the line prior to assembly, if practicable.

To Work with Reduced Numbers.

688. The erection of semipermanent telegraph line may be readily effected by a much smaller team than the regular telegraph section if time of construction is not a dominant factor. In fact, the telegraph section is designed as the maximum crew which can be profitably engaged in work at a single point and at the same time operate each station as soon as installed.

The following is a guide for the employment of individuals when the section is reduced below the quota authorized in the organization table:

CONSTRUCTION.

689. *With 21 men.*—Omit No. 2. Second station not to be cut in until line is completed.

With 20 men.—Omit Nos. 1 and 2. No station to be established until line is completed. Directions for use of 21 or 20 men assumes operation of stations during the construction period is not imperative. If, however, the operation of one or more stations are necessary, variations will have to be made in the assignment of duties of section members to permit provision for the necessary number of operators.

With 19 men.—Omit No. 6. No. 5 operates wire truck alone.

With 18 men.—Omit No. 11. This leaves one digging bar not in use for the time being. It is carried on the wire truck and used by either erecting squad to dig holes for poles tied in if diggers get behind in their work.

With 17 men.—Omit No. 4. No. 3 handles the poles alone.

With 16 men.—Omit No. 15. Chief of section takes motorcycle and performs this duty as necessary.

With 15 men.—Omit No. 10. Chief of section checks tension in addition to other duties.

With 14 men.—Omit No. 12. This leaves but two hole diggers and two unused bars. One bar is taken by each erecting squad who digs all holes for poles tied in.

With 13 men.—Second erecting squad disbanded. Omit No. 9. Chief lineman, Nos. 7, and 8 constitute only erecting squad and dig holes for tied-in poles.

With 12 men.—Omit No. 8.

With 11 men.—Omit No. 7. Chief operator takes his place.

With 10 men.—Omit chief lineman. Chief of section acts as chief lineman. No. 16 checks tension in addition to his other duties.

With 9 men.—Omit No. 13.

With 8 men.—Omit No. 3. No. 17 frames and drops poles in addition to driving truck.

With 7 men.—Omit No. 16. Chief operator takes motorcycle and performs necessary duty therewith.

With 6 to 3 men.—No specific duties can be prescribed. With such a small number of men the various operations in connection with construction must be performed in rotation by the same men. It is assumed that three men is the smallest number who can erect the line.

RECOVERY.

690. *With 21 men.*—No change. No. 1 has no duties.

With 20 men.—No change. No. 2 has no duties.

With 19 men.—Omit No. 3.

With 18 men.—Omit No. 12.

With 17 men.—Omit No. 10.

With 16 men.—Omit No. 8. No. 15 performs his duties in addition to his own.

With 15 men.—Omit No. 15. Chief operator takes over duties and motorcycle.

With 14 men.—Omit No. 9. Chief lineman, chief operator, and No. 7 take down guyed poles.

With 13 men.—Omit No. 7.

With 12 men.—Omit No. 11.

With 11 men.—Omit No. 13.

With 10 men.—Omit No. 4. No. 17 loads truck No. 1.

With 9 men.—Omit No. 14. No. 18 loads truck No. 2.

With 8 men.—Omit chief lineman. Chief of section performs his duties.

With 7 men.—Omit No. 16. Chief of section takes motorcycle.

With 6 to 3 men.—No specific duties prescribed. Operations of recovery must be performed more or less in rotation.

LINE CONSTRUCTION.

691. In the construction of semipermanent telegraph lines the following directions should be carefully observed.

Reconnaissance.

692. If a preliminary reconnaissance of the route to be followed can be made by the chief of section or chief lineman, much will be gained in the matter of rapidity and stability of installation. This will be usually impracticable, however, as the immediate commencement of work will be necessary at the arrival of the section on the ground. Reconnaissance should be had along the route coincident with, or slightly preceding the construction proper. This can usually be done by the chief of section, who should keep the working parties in rear constantly informed of any unusual conditions affecting line construction which obtain.

Use of Lance Poles.

693. These should never be used if any firmer line supports are available. The section carries only 25 iron and no oak brackets. An ample number of the latter fitted with insulators should be especially supplied to any section about to erect a line where it is known good use can be made of them. Attempt should be made to secure a sufficient number of these locally, and every effort possible made to hang the line on the strongest supports found along the route.

To Take up the Slack.

694. Slack is pulled up wherever a pole is tied in. To do this properly the pole to be tied should be laid upon the ground about 1 foot short of the hole. The slack is then pulled up from the last tied pole by one man 4 or 5 yards forward of the pole about to be tied. The tension is checked by a man standing for the purpose about midway between the two ties. When correct a signal is made to this effect and a round turn is made with the line about the insulator before attaching the tie wire. If this process is properly carried out the tie pole should be exactly erect and with proper tension on the line between the ties.

Guying and Guy Stakes.

695. In straight stretches every fifth pole is usually guyed against the line. A guyed pole infers that it is also tied in. If the line is liable to remain up sometime or stormy weather is anticipated, much greater line strength may be obtained by guying four ways on straights. All corners should be guyed and care should be taken to see that the guy is securely fastened both to the pole and the stake.

No special guy stakes are furnished. Every possible means to fasten guys to stable supports along the line should be utilized. Failing in this, guy stakes should be improvised from material found along the route. In some cases it may be necessary to cut up lance poles to make guy stakes. This procedure should be limited to broken poles as far as possible, the same being preserved for this purpose.

To Cut in Stations.

696. This is always done in series, a convenient way being to use a strain insulator or porcelain knob as a circuit breaker. The station is then connected by cutting to ground or looping, depending on whether or not the instrument is an end or an intermediate station.

Digging Methods.

697. To start the diggers promptly and to provide a method for readily getting them out of the way of the construction proper the following is suggested. No. 11 starts digging the first hole, No. 12 goes to location of second hole and after being lined in by the chief lineman digs that hole. Nos. 13 and 14 are carried forward by motorcycle to fourth and sixth holes, respectively. Each hole digger then lines in on the general line by back sight and digs holes. Every hole digger is relayed forward after digging two holes. Generally two diggers are ready at the same time to be carried forward.

OPERATION AND MAINTENANCE.

698. The section is furnished with sufficient personnel to operate three stations on the section line if the same is desired. On account of limited transportation, only a sufficient supply of stationery and office material is carried to permit the operation of the stations for a very short time. If the operation of the stations for more than two or three days can be anticipated, timely requisition should be made for the necessary telegraph office material to properly equip the stations. The continued use of message books and field message envelopes is not satisfactory on semipermanent lines. If the stations are expected to operate any great length of time a typewriter should be furnished to each.

699. If the line is to be operated for any extended period the personnel and transportation should be distributed amongst the various stations. No precise rule can be laid down governing this distribution, as it will vary in different cases, but it should in general accord with the following principles.

Sufficient personnel should be attached to each station to permit the greatest ease of operation and maintenance. The transportation should be distributed so that at least one motor vehicle should be at each station, for the purpose of covering the line when necessary. To insure proper supervision, the chief of section, chief operator, and chief lineman should each be at separate stations. The quota of the telegraph section is based upon economy and rapidity in construction work; the section line can be efficiently operated and maintained by a far less number of men.

700. Lance line in general is hard to maintain. In some cases initial rugged construction will partially obviate this. The presence of motor transportation makes the covering of the line a rapid and an easy matter. Under these circumstances the entire line should be covered daily, weather permitting, and such minute inspection made to locate defects as will in great measure prevent the occurrence of trouble. When trouble does occur immediate action, irrespective of time or weather, should be had to remove it.

SECTION III.—THE TELEPHONE SECTION.

FUNCTION.

701. The primary function of the telephone section is the erection of divisional telephone systems at points where the permanence of the camp makes this procedure necessary or desirable. Furthermore, the telephone section is designed to assist or substitute for telegraph sections in the construction of semipermanent telegraph lines, if conditions render the performance of such duty advisable.

COMPOSITION.

702. The telephone section consists of 18 men. In detail it is as follows:

1 chief of section, sergeant first class.
1 chief operator, sergeant.
1 chief lineman, sergeant.
3 switchboard operators, corporals.
7 linemen—6 privates first class, 1 private.
3 drivers, privates first class.
2 messengers, privates.

ORGANIZATION AND EQUIPMENT.

703. The section is organized and equipped to install, operate, maintain, and recover one divisional semipermanent telephone system. The installation includes 17 miles of metallic circuit (twisted pair) line, one switchboard, and 20 camp telephones. The board is wired to receive two common battery trunks for long-distance work. No other special additions or arrangements are necessary for this purpose. The installation will ordinarily consume the greater part of two working days.

704. The transportation is identical with that of the telegraph section, and the matériel has many articles in common. The personnel is transported as in the telegraph section.

705. Depending on conditions, the personnel of the section may be assigned to various duties after its matériel is installed. It may remain intact at the station where its equipment is installed, operating and maintaining the system and being in constant readiness to recover the latter and transport it to another theater of operations. It may on completion of the installation be called upon to proceed to other work, leaving the erected system intact and sufficient crew to properly operate and maintain it. As with the telegraph section, the section is expected to be a self-sustaining unit under all conditions.

DUTIES OF INDIVIDUALS.

706. The chief of section exercises general supervision over the work of his section.

The chief operator during installation supervises the setting up of the switchboard and the connection of the various telephones. During operation he supervises the general working of the system especially with reference to the switchboard. If the system is immobilized and but one man is left with it, the chief operator usually is assigned to this duty.

The chief lineman in general supervises the construction, maintenance, or recovery of the line. In installation he is especially charged with the proper location of the several lines.

The switchboard operators take active part in installation and recovery of lines performing such duties as may be specifically assigned; during operation their duties pertain to the handling of the switchboard.

The linemen install, maintain, or recover the lines under direction of the chief lineman or chief of section.

The drivers operate their trucks as may be necessary. When not needed for this purpose they perform other assigned duties.

The messengers perform the duties of linemen during the installation of the system. After this is completed they perform such messenger service as is necessary in connection with the telephone central.

NUMERICAL DESIGNATION OF MEMBERS.

707. The men of the telephone section, except the chief of section, chief operator, and chief lineman, are numbered from 1 to 15 for the purpose of prescribing their positions and duties in various drills and formations.

Specifically they are divided in squads and numbered as follows:

Switchboard squad:
  Chief operator, in charge.
  1. Corporal, switchboard operator.
  2. Private, first class, lineman.
  3. Private, lineman.
  4. Private, first class, driver.

First line squad:
    5. Private, first class, lineman.
    6. Corporal, switchboard operator, in charge.
    7. Private, first class, lineman.
    8. Private, messenger.
Truck squad:
    9. Private, first class, driver.
    10. Corporal, switchboard operator, in charge.
    11. Private, first class, lineman.
    14. Private, first class, driver.
Digging squad:
    Chief lineman, in charge.
    12. Private, first class, lineman.
    13. Private, first class, lineman.
    15. Private, messenger.

After completion of duty in connection with the installation of the switchboard and the erecting of the terminal pole a second line squad is formed as follows:

Second line squad:
    1. Corporal, switchboard operator, in charge.
    2. Private, first class, lineman.
    3. Private, lineman.
    4. Private, first class, driver.

The section is formed so as to preserve the integrity of the above-named squads.

FORMATION OF THE SECTION.

708. The section is formed in line in double rank with the odd numbers in the rear rank and even numbers in the front rank. The chief of section is 2 yards in front of the center of his section and the drivers in the line of file closers.

POSTS OF INDIVIDUALS.

709. Positions of all individuals are shown in plate 9.

The formation in park is identical with that of the telegraph section, the trucks being formed from right to left as follows: No. 1, switchboard; No. 2, wire; No. 3, lance.

DISTRIBUTION OF MATERIEL FOR TRANSPORT.

710. This is assigned in accordance with the principles which govern the distribution of loads in the telegraph section.

Specifically, the section carriages are loaded as follows:

Truck No. 1: All matériel of the section except that carried on trucks 2 and 3.

Truck No. 2: All wire of section.

Truck No. 3: Three hundred lance poles and necessary insulators therefor.

TO FORM THE SECTION.

711. The section is formed in a similar manner to the telegraph section.

On account of the small number of men present with the telephone section, the chief makes such assignments and details for truck loading as will best facilitate the work.

MANEUVER.

712. The section is maneuvered by the same commands and in accordance with the same principles as the telegraph section.

TECHNICAL DRILL.

General Provisions.

713. The general provisions governing the construction of lance-pole telegraph lines apply to telephone work.

It is almost impossible to construct a thoroughly substantial twisted pair line on lance poles. The load limit of the transportation furnished does not permit the carrying of the requisite number of lance poles necessary to support the entire system. For the above reasons advantage should be taken to utilize every stable support about the camp to carry the lines. The survey for the system should be almost entirely based upon the making use of the natural and artificial features available.

714. If conditions permit, all or a portion of the line may be placed underground. The climatic conditions and character of the subsoil will determine whether or not this method will give practical results; if adopted, means for protecting the underground lines at road crossings should be provided.

715. The proper erection of the divisional camp telephone system will generally call for more ingenuity and improvised expedients than are usually necessary in the construction of the typical section telegraph line.

Preliminary Reconnaissance.

716. The construction of any telephone system, permanent or temporary, involves a more or less extended reconnaissance of the site where the system is to be located. Only after such reconnaissance is made can an intelligent plan be formulated for the erection of the system.

On receipt of orders to install the system at a certain location, the chief of section and chief lineman will proceed at once, by motorcycle to the point designated to make the required reconnaissance.

717. In conducting the reconnaissance all possible assistance will be rendered by the camp commander or others on the ground, in the matter of supplying information as to the location of telephone stations and other necessary data.

718. After the reconnaissance is complete an intelligent plan for the erection of the system will be formulated, supplemented by a sketch. This should show the location of the central and all telephone stations; the routes to be followed by the various lines; the character of supports for the same with the necessary cabling, and any underground sections of the line, if such be decided upon.

719. Reconnaissance is imperative before any work is commenced. If arrangements can not be perfected to accomplish it before the arrival of the section on the ground, construction work will have to be postponed until it is complete. In the latter case it may be more or less hurried but in no case can it be omitted.

720. Whenever the chief of section leaves the section for this or any other necessary purpose, the section will be conducted en route or perform any other assigned duty under direction of the chief operator or other senior noncommissioned officer in charge.

To Prepare to Open Station.

721. When the section has arrived at the camp site at which it is to install the system, the necessary reconnaissance having been made and the plans for the erection of the system formulated, it is parked at a point convenient to the location of the central. The chief of section then commands: **PREPARE TO OPEN STATION.** At this command all dismount from the carriages and each member provides himself with the proper equipment incident to his employment in the work. The section is then formed in line by the chief of section who verifies the men, the individual equipment of each and gives such instructions as are necessary regarding the character and order of construction of the various radiating lines.

To Open Station.

722. At the completion of the necessary preliminary directions, the chief of section gives the command **OPEN STATION.** At this command construction work is begun, the system being erected generally as follows:

The switchboard squad unloads the switchboard truck at the proper location of central; it sets up the switchboard in the designated shelter, erects the terminal pole and connects the lines to the board as soon as available.

The digging squad digs holes to receive the poles.

The truck squad drops poles fitted with insulators at points convenient to their erection and lays the necessary wire.

The line squad or squads follow, erecting the line, pulling up slack, tieing, guying, and tamping. The specific duties of the various squads in the erection of the system are as follows:

Switchboard squad: Unloads switchboard truck, sets up switchboard and erects terminal pole. Connects all loose lines at pole on completion of erection of same. The work in connection with the board being complete, Nos. 1, 2, 3, and 4, under charge of No. 1, become a second-line squad and report to the chief of section for assignment to duty in erecting lines. After completion of the central station the chief operator installs and connects all telephones at the various places as fast as the several lines from the board to each are intact. He also connects into the board any loose line at any time found at the terminal pole.

Truck squad: Nos. 10 and 14, with truck No. 3, drop lance poles fitted with insulators at points convenient for erection; also drop guys and stakes at proper points for use. Nos. 9 and 11, with truck No. 2, lay the lines from the reel attached to the rear end of the truck.

Digging squad: Under supervision of the chief lineman digs holes to receive lances or other supports to be used in erection of the line. When all work of digging is completed the digging squad becomes a third line squad and proceeds to perform such erecting work as may be assigned to it.

Line squad: Erects poles, stretches wire, ties in, guys, and tamps.

The duties of the separate individuals of the section except as above described are not definitely specified. The members of the various squads are assigned by their chiefs to such duties in connection therewith as may be necessary to facilitate the work.

To Prepare to Close Station.

723. Preliminary to the recovery of the system it is assumed that sufficient notice will be given the section to allow it to break camp and properly dispose of the individual equipment of its members.

This having been done and the trucks parked at a point convenient to central, the chief of section commands: **PREPARE TO CLOSE STATION.** At this command the section forms similarly as in preparing to open station. Detailed instructions and directions are then given the section relative to the recovery of the lines.

To Close Station.

724. All preliminary arrangements having been completed, to recover the system, the chief of section commands: **CLOSE STATION.**

The line is generally recovered as follows:

The switchboard and telephones are disconnected, recovered, and packed away, together with all miscellaneous material on the switchboard truck. The poles are taken down and loaded on the proper trucks. The wire is reeled up, bound in suitable coils, and loaded on the wire truck.

The specific duties of the various squads in the recovery of the system is as follows:

Switchboard squad: Chief operator and No. 2 disconnect the switchboard and prepare it for loading. Also disconnect, recover, and pack all telephones, bringing in same to switchboard station in motorcycle and side car. Nos. 1, 2, and 4 recover the allotted quota of lances and insulators (all over 300) to be carried on truck No. 1, and load same. Truck No. 1 is then brought to the central station, and the terminal pole is taken down, if to be recovered. All supplies carried by truck No. 1 are then loaded on it by the entire switchboard squad under the direction of the chief operator.

Line squad: Assisted by No. 12, removes poles and unties the line therefrom. Recovers all guys and such stakes as may be ordered.

Truck squad: No. 10, assisted by No. 13, removes insulators from poles and loads poles and insulators on truck No. 3.

No. 11, assisted by No. 15, reels up wire, ties same in proper-sized coils, and then loads on truck No. 2.

If necessary to expedite the work of recovering the wire, truck No. 1, after being loaded, will reel up wire, using for this purpose the extra reel operated by members of the switchboard squad.

725. The above assignment of construction duties to the various members of the section is intended as a guide, but one which should be generally followed in erecting the lines on lances. Where other supports for the lines are used, the chief of section will make such changes in assignments of duties as the use of different material requires.

To Work With Reduced Numbers.

726. The following is prescribed as a guide for constructing and recovering the divisional telephone system when for any reason the section is reduced below its normal quota.

CONSTRUCTION.

727. *For 17 men.*—Omit chief operator. No. 1 acts as chief operator in addition to his other duties. Telephones are not installed until line completed unless other arrangements can be made.

For 16 men.—Omit No. 3. Nos. 1, 2, and 4 constitute switchboard squad. After completion of duties at the board become second-line squad of three men; are assisted when necessary by chief of section.

For 15 men.—Omit No. 2. Switchboard squad consists of Nos. 1 and 4. First-line squad assists in erection of terminal pole. After completion No. 1 installs telephones; No. 4 joins first-line squad. No second-line squad is formed.

For 14 men.—Omit No. 8.

For 13 men.—Omit No. 1. No. 6 acts as chief operator. First-line squad takes over duty of switchboard squad entire in addition to other duties.

For 12 men.—Omit No. 15.

For 11 men.—Omit No. 10. No. 14 puts off poles in addition to driving his truck.

For 10 men.—Omit No. 11. Trucks Nos. 2 and 3 alternate in laying wire and dropping poles as may be necessary. Nos. 9 and 14 attend each truck separately, other truck remaining idle.

For 9 men.—Omit chief lineman. Chief of section performs his duties.

For 8 men.—Omit No. 12. Switchboard and first line squad are combined, consists of Nos. 4, 5, 6, and 7. Truck squad and digging squad are combined, consists of chief of section, Nos. 9, 13, and 14. Squads perform duties alternately as may be necessary.

For 7 men.—Omit No. 13. Chief of section and No. 9 man wire truck in laying wire and No. 14 drops off poles in addition to driving truck.

For 6 men.—Omit No. 6. Chief of section performs his duties. Trucks Nos. 2 and 3 alternate in laying wire and dropping poles. Nos. 9 and 14 attend each truck separately, leaving other truck idle.

For 5 men or less.—The duties are performed in rotation by the squads as may be necessary to best facilitate the work. Four men is the minimum number which can install the system.

RECOVERY.

728. *For 17 men.*—Omit No. 12.

For 16 men.—Omit No. 3.

For 15 men.—Omit No. 8. Chief lineman takes his place.

For 14 men.—Omit No. 7.

For 13 men.—Omit chief operator. Chief of section takes his place.

For 12 men.—Omit No. 2. Nos. 1 and 4 assist chief of section in preparing switchboard for loading before recovering poles. Chief of section recovers telephones alone.

For 11 men.—Omit No. 13.

For 10 men.—Omit No. 5.

For 9 men.—Omit No. 10. No. 9 recovers poles in addition to driving truck.

For 8 men.—Omit No. 15. No. 9 takes his place. Trucks Nos. 2 and 3 alternate in loading poles and reeling in wire.

For 7 men.—Omit No. 11. Chief of section, Nos. 1, 4, 9, and 14 perform duties of switchboard squad on completion of which the poles are loaded and wire reeled in simultaneously by two trucks assigned to these duties by chief of section.

For 6 men.—Omit No. 1.

For 5 men or less.—Duties incident to recovery are performed in rotation by the squads as is necessary to best facilitate the work. Three men are the minimum number which can recover the system.

LINE CONSTRUCTION.

729. In the construction of the semipermanent divisional system the following directions should be carefully observed.

Use of Lance Poles.

730. Lance poles will only be used where no better line supports are available. Every local advantage, such as trees, tent poles, and telegraph poles should be utilized in construction work. Similarly, cut logs, poles, heavy timbers, or other suitable lumber in the vicinity of the camp should be substituted for lances wherever possible.

If lance poles are used, one pole is erected for each twisted pair carried, up to a maximum of four poles. Where more than one pole is used for this purpose, the poles will be tightly lashed with No. 14 GI wire or other material of equal strength. If two poles are used together they should be lashed in three places; once at each end and once in the middle. Clusters of three or four poles should have four lashings. In all cases the top lashing should be flush with iron pole tip.

Poles should be spaced at distances not to exceed the following: 35 yards when one or two pairs are carried; 30 yards when three to five pairs are carried; and 25 yards when five to eight pairs are carried.

Cabling.

781. All lines will be cabled wherever practicable, as a stronger system and one less liable to damage from camp traffic accrues thereby. Eight pairs is the maximum-sized cable which should be carried on lances. Up to three pairs the lines may be cabled by three lashings of marlin or insulated wire spaced at equal distances between supports. If a line consists of more than three pairs, it should be cabled throughout with marlin.

Depth of Poles.

782. Lances should be sunk to a depth of 14 to 20 inches depending on the size of the cluster. Fourteen inches is the minimum depth for a single lance pole.

Terminal Poles.

783. If practicable, some form of terminal pole should be rigged up and carried with the section. Such a pole, if of sufficient size and properly guyed, can be rigidly set up flush with the ground. If no terminal pole is carried every effort should be made to secure a suitable piece of material from which to make one on arrival at the location for the erection of the system. Failing in this, five lance poles heavily lashed will answer as a terminal pole. In all cases terminal poles should be framed with brackets and insulators before erection and should be strongly guyed four ways.

Guying and Guy Stakes.

734. On straight stretches lances should be guyed both ways, as follows: Every fifth pole carrying one or two pairs; every third pole carrying from three to five pairs; every pole carrying more than five pairs. For guying, if using No. 14 iron wire, guys should be made up to allow one strand of iron wire for each twisted pair carried on the pole. If No. 9 wire is available a single strand will suffice in all save exceptional cases. No. 9 double will take care of any case. Every corner should be guyed against the strain according to the above principles.

Guy stakes as needed should be improvised from material found in the vicinity of the camp. The utilization of every possible means along the lines to which guys can be anchored will limit the number of guy stakes necessary.

Insulators.

735. One insulator fitted to single or double lances and two to triple or quadruple clusters should be used. As many pairs as possible should be split over the insulator before the tie is made. A tie of at least four wraps of insulated wire on each side of the insulator is made on every pole.

To Take Up Slack.

736. Stretch the wire as tautly as possible to the pole about to be erected, which is laid on the ground about 15 inches short of the hole. The strength of two men without blocks or rope is sufficient for this purpose. Make the tie and erect the pole. The pole should then stand absolutely erect and the line have no excess slack.

OPERATION AND MAINTENANCE.

737. The operation and maintenance of the divisional system should give little trouble if proper care is used in installation.

738. The switchboard operators operate the board on a 24-hour shift, if necessary, supervised by the chief operator. At least two competent linemen should be on duty continuously during the day at central to make immediate repairs to telephones or remove any apparent line trouble.

739. If the system is immobilized, by an order for the section to perform duty elsewhere, four men, including the chief operator, should be left to care for the system, any necessary assistance being given them in this work by details of line troops. A withdrawal of the section entire from the erected system should never be done except in grave emergency. In such a case at least one man, preferably the chief operator, should be left with the system, timely arrangements being made to secure a competent detail from other troops to substitute for the regular operation and maintenance crew.

740. As soon as the system is erected and is in working order, the chief of section and chief lineman make a minute and careful inspection of the whole. All apparent defects will be at once corrected and every expedient possible calculated to strengthen the lines or preclude trouble thereon will be utilized.

UNDERGROUND CONSTRUCTION.

741. When necessary or desirable to place all or part of the system underground the following notes may be found useful.

Trenching.

742. This can best be done with a gang of pick-and-shovel men. This method is very slow unless there is a large detail equipped with digging tools to assist the section in this work. A plow is included with each section equipment for this purpose and should be ordinarily used to turn out a furrow trench. The plow is used attached to a truck which furnishes tractive power therefor. The plow should be fastened so as to tow directly behind the middle of the truck at a distance of about 8 feet. In moist soil it will be found necessary to employ mud chains on the wheels to get sufficient traction. Unless the plow used turns a furrow 10–12 inches deep, a second plowing to deepen the trench is necessary. All loose dirt in the furrow trench should be removed by shovel men. After this the trench may be improved if desired by driving a truck with a hind wheel following therein, this making a smooth flat bottom.

Cabling.

743. When more than one pair is trenched the wires should be cabled up to 3 pairs; ties at 10-foot intervals will be found sufficient. Above three pairs the wires should be cabled throughout.

Covering.

744. This is not practicable with the plow. It should be carefully done with shovels and packed as tightly as possible; after which a truck should be run along the trench to complete the tamping.

Guards.

745. Guards of timber, logs, old pipe, or any suitable material should be employed to protect the trench at all road crossings and other points of apparent danger. Due to the inferior grade of insulation the greatest care must be used in handling wires throughout construction to eliminate the possibility of short circuits and subsequent line trouble.

SECTION IV.—THE PLATOON.

FUNCTION AND ORGANIZATION.

746. The platoon consists of two sections. These sections may be both telegraph, both telephone, or one of each. Necessarily, therefore, the function of the platoon is so variable that no accurate description of it is possible.

A platoon is commanded by a first lieutenant, who is responsible for its efficiency while attached to the company, and who supervises its technical work when detached for duty. He is specially charged with the necessary supply of his sections wherever his platoon is detached.

FORMATIONS.

747. Platoon formations are but combinations of the normally formed sections. In park the platoon may be arranged in either of two ways, as follows: Sections in line abreast of each other at 5 yards interval; sections in line one behind the other at 10 yards distance. The decision as to which formation will be taken will usually depend on the ground available. In either case the post of the platoon chief is 5 yards in front of the center of his platoon.

748. In column of route the sections follow each other in the order prescribed by the platoon chief. The post of the platoon chief is normally 25 yards in front of the leading carriage of the leading section. Otherwise he goes wherever his presence is necessary. A minimum distance of 25 yards is prescribed between sections on the road.

TO FORM THE PLATOON.

749. The sections are formed by their chiefs as prescribed in paragraph **671**, the kind of park formation desired having been previously indicated by the platoon chief.

On completion of the inspection by the chief of section they report to the platoon chief from right to left, or front to rear, according to the formation; **(Such) Section, IN ORDER, SIR,** or if anything missing or out of order they so report.

MANEUVER.

750. The platoon is maneuvered in accordance with principles prescribed for the section.

TECHNICAL DRILL.

751. There is no technical drill prescribed for the platoon as such. The section is the largest unit which can operate technically in a single location.

METHODS OF EMPLOYMENT.

752. The functions of the platoon vary so greatly that any well-defined method of employment can not be stated.

A telegraph platoon wil ordinarily be assigned to semipermanent line building the extent of which makes the employment of more than one section unit desirable. Again, it may operate for some time an extended system of semipermanent line. In the first case the platoon chief acts as construction superintendent, coordinating the work of the sections and providing for their timely supply of technical material. In the latter case he acts as superintendent of operation and maintenance with reference to the line operated by his platoon. It may happen that the sections do not construct or operate in contiguous fields. In this case he is charged with general supervision of each.

A telephone platoon necessarily performs its functions with its sections located in different theaters of operations. General and intermittent supervision of construction, operation, and supply is in this case the rôle of the platoon chief.

Operations carried on by mixed platoons will usually partake of a combination of telegraph and telephone section work and will, in general, be governed by the principles laid for the handling of these units.

Section V.—The Company.

FORMATIONS AND POSTS OF INDIVIDUALS.

753. The company is formed **in line** or **in column of route.**

754. It is **in line** when the platoons, with their sections in line one behind the other, are formed abreast of each other.

755. It is **in column of route** when the platoons, each in column of sections in road formation, follow each other in such order as may be directed.

756. The company is habitually parked in line, the carriages of the captain and platoon chiefs being parked on the right of those of the headquarters messengers.

Sections 1 and 2 are telegraph sections; sections 3 and 4, telephone sections. Normally sections 1 and 2 constitute the first platoon and sections 3 and 4 the second platoon. The integral sections of the platoon may be varied by the company commander when necessary.

Plate 10 shows the formation of the company in line and in column of route.

The transportation assigned to company headquarters consists of 1 inspection car (company commander), 5 motorcycles with side cars (1 each platoon chief, 1 first sergeant, and 2 messengers), and 1 headquarters truck.

Thé personnel of company headquarters (less drivers of carriages of captain and platoon chiefs) are transported as follows: Motorcycle No. 1, first sergeant and sergeant mechanic; motorcycles Nos. 2 and 3, messengers and master signal electricians; company headquarters truck, mechanics, horseshoer, and clerk. The supply and mess sergeants and the cooks are carried on the field transportation.

TO FORM THE COMPANY.

757. The company is formed by the first sergeant, the sections falling in in order of their numbers from right to left, as prescribed in paragraph **189**, after which he commands: **By section, FALL OUT.** The procedure outlined in paragraphs **671** and **708** is followed by the sections.

The first sergeant forms the company in line and takes his post.

Each platoon chief, having received the report of his section chiefs, makes a general inspection of his platoon and commands: **REST.**

Upon the approach of the captain, the platoon chiefs call their platoons to attention, and as soon as the captain takes his place in front, report in succession from right to left: **(SUCH) PLATOON IN ORDER, SIR**; or if anything is missing or out of order they so report. As soon as the platoon chiefs have reported to the captain, the first sergeant reports to the captain as prescribed in paragraph **189.**

The enlisted personnel of company headquarters forms when the first sergeant takes his post as follows: Master signal electricians and messengers dismounted in front of their respective carriages and on line with front dismounted rank of foremost sections; personnel of headquarters truck, first sergeant, and sergeant mechanic dismounted in double rank on line with dismounted ranks of rearmost sections, first sergeant on the right.

On the approach of the captain the platoon chiefs and their drivers post themselves dismounted facing to front beside their respective carriages; platoon chiefs on the right, drivers on the left. The captain dismounts to receive the report of the platoon chiefs.

TO DISMISS THE COMPANY.

758. The company being in line and the personnel being mounted on the carriages the captain commands: **DISMISS THE COMPANY.** The platoon chiefs and master signal electricians fall out, their carriages being parked in proper place by the drivers. The first sergeant takes charge of the company and commands: **By section, FALL OUT.** The sections are dismissed as prescribed in paragraph **677.** The personnel of the headquarters truck under charge of chief mechanic sees to the proper disposal of the headquarters property and thereafter is dismissed by the latter.

MANEUVER.

759. The company is maneuvered in accordance with the principles prescribed for the section and platoon.

En route the captain may direct one or both of the platoon chiefs to march in rear of the column, if deemed desirable.

EMPLOYMENT IN THE FIELD.

760. There is no technical drill for the telegraph company as such. It functions wholly through the operations of its platoons or sections. Unity of action will occur in case all four sections are assigned to contiguous telegraph work, permitting direct technical control of all from company headquarters. This, however, will be exceptional rather than the rule of employment.

Sections or platoons generally function while dispersed and isolated, the company headquarters exercising the duties of administration and furnishing reserve supplies, material, and technical assistance when needed.

Telegraph company units will frequently be called upon to work over terrain not necessarily occupied by other troops. This will require independent messing facilities and special arrangements for supply. Duties incident thereto pertain to company headquarters, the same being facilitated by the presence of motor transportation.

The telegraph section carries one day's supply of construction material and only a limited supply of operation material. Timely arrangements must be made by company headquarters for a steady daily flow of technical matériel to the sections if they are to be kept employed. Well-defined plans for this work will be formulated on receipt of orders detaching a section or platoon for duty.

The supply of reserve matériel in the company is practically nil. Requisitions through the battalion commander to the advanced signal depot should be wired in as soon as the need is apparent. These requisitions should state amounts desired and the times and places of delivery. Ordinarily transportation should be furnished by the Quartermaster Corps but unless the same is assured, any motor carriages which are idle should be used for the purpose, if necessary calling on the battalion commander for assistance. It will frequently happen that all the sections of the company are not engaged in work at the same time. In this case idle sections should be utilized locally to supply those at work.

Telegraph companies, especially when engaged in telegraph work proper, differ materially from field companies from the fact that the former lay semipermanent and the latter wholly temporary lines. The general rôle of the telegraph company headquarters is administrative, but whenever practicable, it coordinates the work of its units. Its prime factor is their proper maintenance and supply.

CHAPTER III.—THE TELEGRAPH BATTALION.

FUNCTION.

761. The telegraph battalion is habitually assigned to duty with the army corps. Its function is to maintain communication between the advanced base of the corps and the headquarters of the several divisional units and to furnish such local telephone systems for these units as may be necessary.

ORGANIZATION.

762. The telegraph battalion is composed of one battalion headquarters, one supply detachment, and two telegraph companies.

In detail battalion headquarters and the supply detachment is as follows:

1 major.
1 adjutant (first lieutenant).
1 supply officer (first lieutenant).
1 sergeant major (sergeant, first class).
1 supply sergeant (sergeant).
2 drivers field train (privates, first class).
2 clerks (privates, first class).
3 drivers officers' carriages (privates).
Total, commissioned, 3; enlisted, 9.

The transportation furnished the battalion consists of one inspection car, two motorcycles with side cars, and two field trucks.

763. The major rides in the inspection car, the adjutant and supply officer normally on the motorcycles or side cars. An allowance of one driver for each of these carriages is provided in the enlisted personnel of headquarters. The remaining men of battalion headquarters personnel are carried on the field train.

764. The technical equipment of the battalion is very limited in extent. It consists of certain signaling instruments, the employment of which in the telegraph zone will be exceptional, and a few other necessary miscellaneous articles.

FORMATIONS AND POSTS OF INDIVIDUALS.

765. The battalion may be formed **in line** or **in column of route.**

766. It is **in line** when the companies, each in line, are formed abreast of each other. The normal interval between companies in the battalion is 10 yards.

767. It is **in column of route** when the companies each in column of route follow each other in designated order. The minimum distance between companies in column of route is 50 yards.

768. The posts of individuals in the telegraph battalion staff assimilate those of the field battalion, such changes being made as are necessary to accord with the presence of motor transportation.

MANEUVER.

769. The formation of the telegraph battalion is wholly informal in nature. The major sends directions by his adjutant as to the character of the formation and the position of the base company. The battalion is then formed accordingly and on completion thereof the adjutant reports to the major.

770. No specified maneuvers are prescribed for the telegraph battalion. The major gives directions verbally or through a staff officer to the captains, so as to cause the battalion to take up the desired formation.

EMPLOYMENT OF THE BATTALION.

771. The telegraph battalion performs its functions through its company, platoon, and section units. Battalion headquarters coordinates the work of the detached units where necessary and renders to them all assistance possible especially in the matter of supply.

772. The battalion commander utilizes companies or parts of them to assist others when circumstances demand. He acts as technical inspector of all forms of communication established in his zone and performs such administrative duties as the needs of his battalion require.

PART VI.

BASE-LINE SIGNAL TROOPS.

CHAPTER I.—GENERAL PROVISIONS.

SECTION I.—FUNCTION.

773. Base-line signal troops are those troops which furnish the lines of information to connect commercial systems with the advanced bases of armies in the field and which supplement or supplant the latter service wherever and whenever necessary.

The function of base-line signal troops is broad and varied; broad in that it may extend from the theater of operations to the seat of government itself; varied in that it may comprise any or all forms, means and methods of transmitting information. On this account the employment of these troops, except in a very general way, can not be stated. They are designed to furnish the most suitable means of communication necessary to complete the chain or otherwise supplement or supplant commercial systems in maintaining uninterrupted military lines of information at all times.

SECTION II.—ZONES OF OPERATION.

774. There are none in particular prescribed. Base-line signal troops may operate all or any part of the inner strategical zone if required to do so in performing their function. The operation of these troops in the outer strategical zone will probably be occasionally required due to to the fact that they gradually supresede telegraph signal troops in advance and are replaced by them in retirement. The most usual theater of operations for these troops is, however, in that portion of the inner strategical zone immediately in rear of the telegraph signal troops. For in such locations commercial systems are either entirely lacking or inadequate and reasons for systems operated by troops greatest. Base-line systems should not supplant regular commercial systems unless the latter can not furnish satisfactory service, or good military reasons exist for effecting the change.

SECTION III.—ORGANIZATION.

775. Base-line signal troops are organized as telegraph signal troops. No regular equipment is specified. Transportation, construction and operation material, tools, and technical supplies are furnished these troops as the needs of any special situation may require. Base-line signal troops require a maximum of civil technical skill and a minimum of military training. For this reason these troops will probably be recruited by organization entire from commercial companies and subjected to such military training as may be necessary to cause them to properly function as military units.

Base-line signal troops are administered by company and battalion as in the case of other signal troops. While, as a rule, these troops will operate dispersed, their location along well-defined lines of communication render the details of administration and supply comparatively easy.

CHAPTER II.—CHARACTER OF EMPLOYMENT.

SECTION I.—GENERAL PROVISIONS.

776. Base-line signal troops are employed in any way necessary to effect or maintain communication within their assigned sphere of operations.

The operations of these troops can be divided generally into two classes—construction and operation, together with necessary maintenance, of systems already installed. Employment in either field is limited in extent only by existing means and methods for the transmission of information.

SECTION II.—REPLACEMENT OF SEMIPERMANENT LINES.

777. Telegraph signal troops establish semipermanent lines only when necessary. Where permanent existing lines are found within the telegraph zone their function is solely that of operation. When on advance the telegraph zone becomes merged into the base-line zone, and the troops of the latter replace those of the former. If desirable, they remove such semipermanent lines as may be found. This will probably be done both on account of the unstability of construction of the lines, and to obviate the necessity of employing special instruments in their operation. Wherever permanent lines exist in this zone, base-line troops take over their operation.

SECTION III.—OPERATION OF COMMERCIAL SYSTEMS.

778. Base-line signal troops may be frequently called upon to perform this duty, the principal reason being to provide military supervision, discipline, and control over systems whose primary function is the transmission of military information. Arrangements for troops to replace civil personnel are made by the Chief Signal Officer of the Army, under instructions of the War Department. Such arrangements should provide for taking over entire systems or zones, and care should be taken to distinctly segregate civilian and military operators, thus avoiding any conflict of authority or division of responsibility.

779. The replacement of civil by military personnel applies to all forms of systems of communication, telegraph or telephone, wire, radio, or cable.

780. Ordinarily the nearer the theater of active operations the lines of information approach, the more reason will exist for handling the same by troops in preference to civilians.

781. The conduct of operations of base-line signal troops will be in accordance with the Signal Corps manuals, covering the various phases of permanent construction and operation.

SECTION IV.—PORTABLE RADIO SYSTEMS.

782. These systems are distinctly military and may be horse drawn or motorized, usually the latter. They will frequently be used to supplement wire systems, both permanent and semipermanent, and will usually be located at various points in the outer portion of the inner strategical zone. Corps and Army headquarters will be supplied with these sets, which will form independent lines of information between themselves, to divisional units in front and to important points in rear. These systems will be operated by base-line signal troops properly organized and equipped for this service, under the provisions established for the operation of military radio stations in general.

SECTION V.—SUPERVISION AND CONTROL.

783. Base-line signal troops are organized into companies and battalions in order to permit proper supervision and control in their operations. Sectors or areas will be assigned to units for construction or operation and maintenance, as the case may be, and the unit commander thereof charged with efficient supervision and control therein. Separate units will be assigned, if practicable, to function wholly within the jurisdiction of a single higher commander to whose orders they will be subject for administration and discipline, and to whom they look for supply.

784. The signal officer of the line of communications is charged with the technical supervision and inspection of base line signal troops within his jurisdiction.

CHAPTER III.—DEPOT SIGNAL TROOPS.

785. These troops are organized into companies for service in peace and into battalions for service in war.

786. In peace these companies are primarily formed for the purpose of administration. The personnel performs, in general, detached duty in connection with the installation, operation, and maintenance of interior systems of communication. In so far as applicable, they perform such duties of base line troops as exist in peace time.

787. In war these troops are organized into battalions as administrative and training units designed to keep the ranks of active organizations supplied with trained personnel as the needs require. Depot battalions in war should be organized on a basis of one to each Army corps.

788. The companies of depot battalions are composed as follows:

1 captain.
5 first lieutenants.
3 master signal electricians.
1 first sergeant (sergeant, first class).
1 supply sergeant (sergeant).
1 stable sergeant (sergeant).
1 mess sergeant (sergeant).
4 mechanics (corporals).
2 clerks (corporals).
1 horseshoer.
1 driver (private, first class).
3 cooks.
2 buglers.
1 wire-section (14 men).
1 radio pack section (10 men).
1 radio wheel section (20 men).
1 outpost platoon (21 men).
1 telegraph section (22 men).

1 telephone section (18 men).
45 recruits for training.
Total, 6 officers and 170 men.

789. The depot battalion is composed of a headquarters and supply detachment, as prescribed for the telegraph battalion, and two depot companies.

790. Active and intensive training will be had by classes designed to qualify men to fill specific vacancies whenever requisitioned for by organizations engaged in duty at the front.

PART VII.

TECHNICAL APPARATUS AND INSTRUCTION.

CHAPTER I.—GENERAL.

791. As early as practicable instruction in signaling will be taken up and carried forward coincidentally with the mounted and dismounted instruction. Inasmuch as this instruction, particularly in the beginning, is largely theoretical and scholastic in its nature, schedules should be arranged with a view to taking advantage of afternoon and evening periods for same. In addition, when outdoor work is prevented by inclement weather, that herein outlined will be carried forward. In any event instruction in that portion of these subjects pertaining to a particular organization will be pursued consecutively and energetically to proficiency in that organization.

792. Signaling instruction includes instruction in visual signaling, telegraphy, the simple principles involved in the construction, operation, and repair of the electrical instruments used in the company, together with a complete training in Signal Corps field duties. Only those men capable of taking the advanced course in electricity will be given same; and these with a view to promotion to first-class sergeants and master signal electricians.

793. The description and consideration of the technical apparatus referred to herein is necessarily brief. In organization and post schools, the provisions of these regulations will be supplemented by the more exhaustive treatment of technical subjects to be found in the various Signal Corps Manuals. For advanced work, such additional text books in electricity, telegraphy, telephony, and radiotelegraphy as may be prescribed by higher authority will be used.

794. In general, visual signaling will first be taken up, followed, in order, by telegraphy, the study of the technical apparatus pertaining to the particular organization concerned and the study of other technical apparatus. Telegraphy will not be taught until proficiency has been attained in visual signaling with flags.

SECTION I.—MESSAGE FORMS AND RULES.

795. The following message blank is prescribed for the transmission of all messages in the field which are reduced to writing:

U. S. Army field message.

TIME FILED	NO.	SENT BY	TIME	RECEIVED BY	TIME	CHECK

THESE SPACES FOR SIGNAL OPERATORS ONLY

From ....

At ....

HOW SENT

Date .... Hour .... No. .... | ....

To ....

....

....

....

....

....

....

....

....

....

....

....

This blank is 4⅝ by 6¾ inches, including the margin on the left for binding. The back is ruled in squares and provided with scales for use in making simple sketches explanatory of the message. It is issued by the Signal Corps in field-message books of 50, with duplicating sheets and two sheets of carbon paper. Instructions for operators in the use of these blanks and of the field-message book are found in each book.

796. The term "field message" is applied to all messages sent over field lines of information. All field messages for transmission over field lines of information by electrical or visual means should be plainly written by the sender on the blank forms. The practice of verbally delivering telegrams to enlisted men for transmission should invariably be discouraged.

797. In framing telegrams all words not important to the sense will be omitted. The last name of the officer addressed or his title and the last name of the sender are generally sufficient. Proper names in any part of the message, code or cipher words, should be written or printed in ROMAN CAPITALS, thus: SMITH, TOLEDO, MAUMEE ROAD.

798. The regulation envelope is 3⅛ by 5½ inches, and is printed as follows:

Signal Corps Form 144a.

FIELD MESSAGE—U. S. ARMY.

To ------------------------------------ No. ------------------

(For signal operators only.)

When sent -- **No** --------

Rate of speed -------------------- **Name of messenger** --------------

When and by whom rec'd --

THIS ENVELOPE WILL BE RETURNED TO BEARER.

799. Detailed regulations for the operation of lines of information and military telegraph stations are found in Regulations for United States Military Telegraph Lines, Alaskan Cables, and Telegraph Stations, United States Signal Corps, 1915.

CHAPTER II.—VISUAL SIGNALING.

SECTION I.—THE CODES.

800. The soldier will first be taught the alphabet in the General Service and Semaphore Codes, with numerals, abbreviations, and conventional signals, the correct positions of the flags and the correct method of setting up and adjusting the heliograph and lantern.

INTERNATIONAL MORSE OR GENERAL SERVICE CODE.

801.

Alphabet.

A	• —	N	— •
B	— • • •	O	— — —
C	— • — •	P	• — — •
D	— • •	Q	— — • —
E	•	R	• — •
F	• • — •	S	• • •
G	— — •	T	—
H	• • • •	U	• • —
I	• •	V	• • • —
J	• — — —	W	• — —
K	— • —	X	— • • —
L	• — • •	Y	— • — —
M	— —	Z	— — • •

Numerals.

1	• — — — —	6	— • • • •
2	• • — — —	7	— — • • •
3	• • • — —	8	— — — • •
4	• • • • —	9	— — — — •
5	• • • • •	0	— — — — —

Punctuation.

Period	• • • • • •
Comma	• — • — • —
Interrogation	• • — — • •
Hyphen or dash	— • • • • —
Parentheses (before and after the words)	— • — — • —
Quotation mark (beginning and ending)	• — • • — •
Exclamation	— — • • — —
Apostrophe	• — — — — •
Semicolon	— • — • — •
Colon	— — — • • •
Bar indicating fraction	— • • — •
Underline (before and after the word or words it is wished to underline)	• • — — • —
Double dash (between preamble and address, between address and body of message, between body of message and signature, and immediately before a fraction)	— • • • —
Cross	• — • — •

Conventional signals for use with the General Service Code.

802. The following conventional signals will be used with the International Morse or General Service Code:

Distress signal (ship stations only)	. . . — — — . . .
Attention (or call)	The call is composed of the attention signal — . — . —, followed by the call letters of the station called, repeated three times (if unknown use CQ (— . — . — — . —) in place of call letters of station called), followed by DE (— . . .) and then the call letters of the calling station, repeated three times.
Have you anything for me	QRU (— — . — . — . . . —)
How many words have you to send	QRJ (— — . — . — . . — — —)
Invitation to transmit (go ahead)	— . —
Signal separating preamble from address, address from text, and text from signature	— . . . —
End of message	. — . — .
End of work	. . . — . —, followed by the call letter of sending station and — . —
Received (acknowledgment of receipt of message)	R (. — .), followed by the call letter of the receiving station and personal signal of the receiving operator.
Here is another message	— . — . — (attention call).
Understood (or I understand)	. . . — ., followed by the call letters of station.
Not understood (or repeat)	. . — — . . (interrogatory) and the last word received.
Error	. . . .
Wait	. — . . .
Official message	OFM (— — — . . — . — —)
(First word of preamble on all radiograms)	RADIO (. — . . — — . . . . — — —)
Faster	QRQ (— — . — . — . — — . —)
Slower	QRS (— — . — . — . . . .)
Stop sending	QRT (— — . — . — . —)
Interference	XX (— . . — — . . —)
Use International Code of Signals	PRB (. — — . . — . — . . .)
General inquiry call (when call of station is not known)	CQ (— . — . — — . —) (see attention call).
How do you receive me	QRK (— — . — . — . — . —)

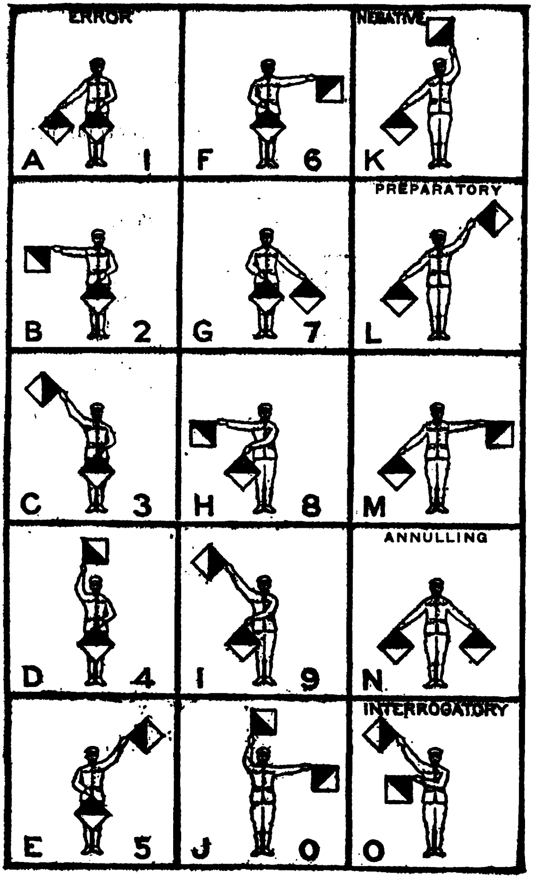
Transmission of Messages by International Morse or General Service Code.

EXAMPLE.

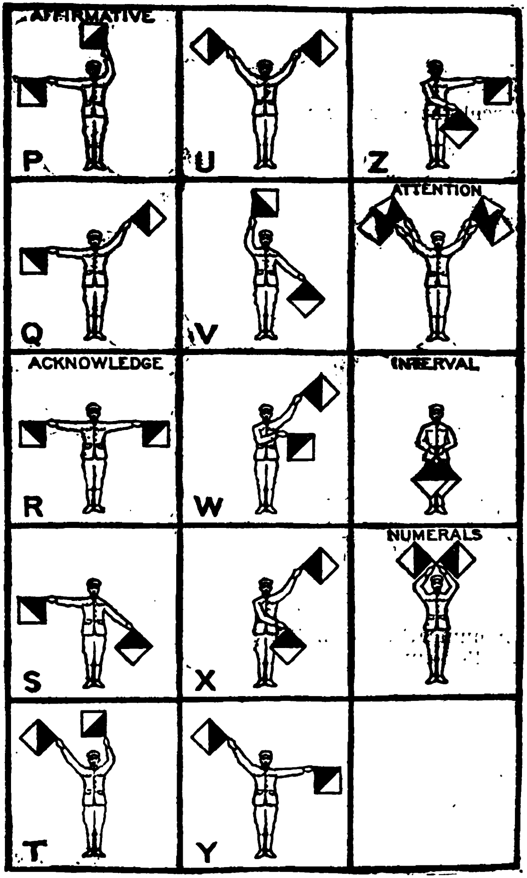
803. WVB sending to WVA a plan commercial message filed at 4 p. m. of the 12th, after receiving — · —

— · — · —
RADIO
Circle City.......................................Office of destination.
D°.
Fairbanks.......................................Office of origin.
2.......................................Number of message.
L.......................................Operator's sign.
8.......................................Check.
Twelfth 4 pm.......................................Date and hour of filing.
— · · · — ....Break or double dash.
Brown 175 King Street
Circle City.......................................Address.
— · · · — ....Break.
Arrive tomorrow.......................................Text.
— · · · — ....Break.
Jones.......................................Signature.
· — · — ·
KMO
— · —

804. THE SEMAPHORE CODE WITH HAND FLAGS.



THE TWO-ARM SEMAPHORE CODE WITH HAND FLAGS.



CONVENTIONAL VISUAL SIGNALS.

805. The following conventional signals, with exceptions noted, will be used in signaling by flag, heliograph, flash lantern, searchlight (with shutter) or semaphore hand flags:

		Exceptions. Ardois and semaphore.
End of word.	Interval.	
End of sentence.	Double interval.	
End of message.	Triple interval.	
Signal separating preamble from address; address from text; text from signature.	— • • • —	Double interval, signature preceded also by "sig." Interval.
Acknowledgment.	R.	
Error.	• • • • • • • •	A.
Negative.	K.	
Preparatory.	L.	
Annuling.	N.	
Affirmative.	P.	
Interrogatory.	• • — — • •	O
Repeat after word.	Interrogatory, A (word).	
Repeat last message.	Interrogatory three times.	
Send faster.	QRQ	
Send slower.	QRS	
Cease sending.	QRT	
Wait a moment.	• — • • •	None.
Execute.	IX, IX	
Move to your right.	MR	
Move to your left.	ML	
Move up.	MU	
Move down.	MD	
Finished (end of work).	• • • — • —	None.

In communicating with the Navy by any method, numerals will be spelled out.

SECTION II.—ELEMENTARY INSTRUCTION.

VISUAL STATIONS.

806. Signal parties should consist of four men, equipped with the necessary visual signal equipment for the operation of one station. The instructor indicates the point where the station is to be established and the location of the station or stations with which communication is to be conducted.

807. At the command **open station** the signal equipment is made ready for use.

One man is designated to record incoming messages and to call off the words of the message being sent.

A second man manipulates the sending apparatus and reads and calls off incoming messages for the recorder.

A third man watches the distant station for breaks.

A fourth man is horse holder and messenger.

The duties of each will be varied until all are familiar with various duties.

808. The General Service code will always be used with the flag, and the alphabet and conventional signals will be thoroughly mastered by means of wand drill before any effort is made to do outside work. This instruction will be conducted at such time and in such schools as prescribed by the company commander or higher authority.

809. The outside or field work will be conducted by sections, which may be divided into convenient squads of four. Chiefs of sections and their assistants will be the instructors. These units lend themselves readily to the use of the flag, heliograph, and lantern, as well as for convenience in camping.

SIGNALING BY FLAG.

810. For the flag used with the General Service Code there are three motions and one position. The position is with the flag held vertically, the signalman facing directly toward the station with which it is desired to communicate. The first motion (the dot) is to the right of the sender, and will embrace an arc of 90°, starting with the vertical and returning to it, and will be made in a plane at right angles to the line connecting the two stations. The second motion (the dash) is a similar motion to the left of the sender. The third motion (front) is downward directly in front of the sender and instantly returned upward to the first position. Front is used to indicate an interval.

SIGNALING WITH HELIOGRAPH, FLASH LANTERN, OR SEARCHLIGHT (WITH SHUTTER).

811. The first position is to turn a steady flash on the receiving station. The signals are made by short and long flashes. Use a short flash for dot and a long steady flash for dash. The elements of a letter should be slightly longer than in sound signals.

To call a station make its call letter until acknowledged.

If the call letter of a station be unknown, signal A until acknowledged. Each station will then turn on a steady flash and adjust. When the adjustment is satisfactory to the called station, it will cut off its flash, and the calling station will proceed with its message.

If the receiver sees that the sender's mirror or light needs adjustment, he will turn on a steady flash until answered by a steady flash. When the adjustment is satisfactory, the receiver will cut off his flash and the sender will resume his message.

To break the sending station for other purposes, turn on a steady flash.

It may be noted that in the daytime and in ordinary weather the searchlight with shutter can be readily used for distances up to 10 miles at sea. This method of day signaling is considered of exceptional value by the Navy, and is commonly used by the Coast Artillery in target practice from the shore to the tug towing the target. It is independent of background and may be used behind armor or other shelter; it should be frequently used for signaling by day as well as by night.

SIGNALING WITH HAND FLAGS.

812. Hand flags are authorized for general use by the Army, though on account of their small range they are of limited application, and are chiefly serviceable for use within fixed positions, or for incidental signaling. The range is, of course, dependent upon light and background, but is seldom more than 1 mile with the naked eye. This system of signaling has been highly developed in the Navy, and on account of its rapidity and simplicity is of use to the Army and should be familiar to all Signal Corps soldiers. It will be found useful under many circumstances, and is adapted to special work when rapid communication for short distances is needed.

813. In making the interval the flags are crossed downward in front of the body just above the knees; the double interval is the "chop-chop" signal made twice. The triple interval is "chop-chop" signal made three times. The "chop-chop" signal is made by extending both arms to the right horizontally and then moving the flags up and down with a cutting motion. As the flag in the right hand is moved up, that in the left hand is moved down. In calling a station face it squarely and make its call. If there is no immediate reply wave the flags over the head to attract attention, making the call at frequent intervals. When the sender makes "end of message," the receiver, if message is understood, extends the flags horizontally and waves them until the sender does the same, when both leave their stations. Care must be taken with hand flags to hold the staffs so as to form a prolongation of the arms.

SECTION III.—THE WAND.

814. The wand is a stick of light wood about 18 inches long and one-half inch in diameter. It is held loosely between the thumb and forefinger and waved rapidly to the right or left to indicate the elements of the alphabet. It is used for practice purposes, and the signals made by it are only intended to be read at very short distances. Its effectiveness may be increased by tying a handkerchief near the outward end.

SECTION IV.—FLAG KITS.

815. Three kinds of flag kits are issued by the Signal Corps for use with the General Service Code and the Two-arm Semaphore Code; the combination, standard, 2-foot kit; the combination infantry, 2-foot kit; and the standard 4-foot kit.

THE COMBINATION, STANDARD, 2-FOOT KIT.

816. The combination, standard, 2-foot kit consists of 1 case, canvas; 1 staff. 3-joint; 1 flag, red, white square; 1 flag, white, red square; 2 staffs, semaphore; and 2 flags, semaphore, standard. The red flag is made of red galatea, 2 feet square, with an 8-inch white center. The white flag is of similar size and material, the only difference being an alternation of colors in the body and center. The means of attachment to the staff consists of a loop at the center and two ends of white tape at each edge of the back of the flag body. The staff for these flags is made of hickory in three joints, each joint being 23 inches long, and is assembled by means of a brass screw ferrule. Brass eyes are provided on the first and second joints to receive the tape ends at the edge of the flag. The semaphore flags are 18 inches square, divided diagonally into two parts, one of red and the other white, the red portion constituting the upper half of the flag. The staffs are 24 inches long. The carrying case is of convenient size and shape to carry the flags and staffs above enumerated and is bound with leather and fitted with shoulder straps.

THE COMBINATION INFANTRY 2-FOOT KIT.

817. The combination, infantry, 2-foot kit is essentially the same as the combination, standard, 2-foot kit, except that 1 infantry flag is substituted for the two 2-foot red and white flags above described.

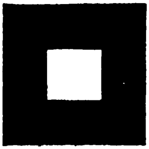
THE STANDARD 4-FOOT KIT.

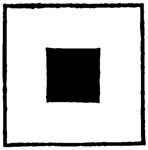
818. The standard 4-foot kit consists of 1 case, canvas; 1 staff, 3-joint, and 1 flag, red, white square; and 1 flag, white, red, square. The flags are 3 feet 9 inches square, with 12-inch centers, and the staffs are considerably heavier than those of the standard 2-foot kit, each joint being 36 inches long. The 4-foot kit is the standard field flag kit, and the range at which signals can be exchanged with it depends on a variety of factors, such as conditions of the weather, the location of stations, and the proficiency of signalmen. The speed for continuous signaling is seldom greater than five or six words per minute.

POWERS AND LIMITATIONS OF FLAG SIGNALING.

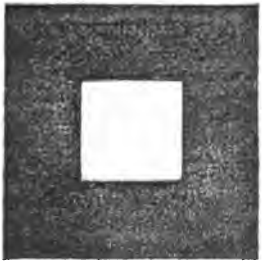
819. The advantages which may be claimed for this method of signaling are portability of apparatus, adaptability to varied weather conditions, and great rapidity of station establishment. The disadvantages are the lack of celerity of the signals, their impenetrability to dust or smoke, and the comparatively short ranges at which they can be read. These ranges vary with the background, light, vision, and power of glasses if used.

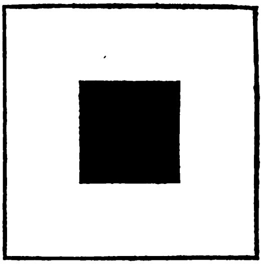
SIGNAL CORPS TWO FOOT FLAGS



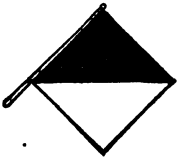


SIGNAL CORPS FOUR FOOT FLAGS





SEMAPHORE HAND FLAGS



CARE OF FLAG MATERIAL.

820. Signal flags should be examined at the close of drill or practice and repairs made to any rents or loose ties discovered. Flags, when soiled, should be thoroughly washed and dried in the sun. Signals made by clean flags are much more easily read than those made by dirty ones. Staffs should be handled with care, especially when jointing or unjointing. Care should be taken not to bruise the ends of the brass ferrules. Ferrules fitting together so loosely as to permit separation of the joints in signaling must not be hammered or jammed, but should be tightened by wrapping one or more thicknesses of thin paper around the one which is inserted in the other. If a ferrule becomes loose on a staff it should be tightened without delay.

SECTION V.—THE HELIOGRAPH.

821. The heliograph is an instrument designed for the purpurpose of transmitting signals by means of the sun's rays.

DESCRIPTION.

822. The complete heliograph consists of:

1 sole-leather pouch with shoulder strap containing—
    1 sun mirror } inclosed in a wooden box.
    1 station mirror }
    1 shutter.
    1 sighting rod.
    1 screw driver.
  1 small leather case sliding by two loops upon the strap of the pouch containing—
    1 mirror bar.
  1 skeleton leather case containing—
    2 tripods.

The mirrors are of plate glass, 4½ inches square. The sun mirror has a paper disk covering the unsilvered spot in its center. The shutter is 6½ inches square, has six leaves, operated by a key; and the key bar is provided with a stop to regulate the adjustment. The two tripods are alike, so that the mirror bar or shutter may be fitted to either, and each has a hook to which a weight may be suspended for stability.

ASSEMBLING.

828. There are two ways of assembling the heliograph, and the position of the sun is the guide in determining which of the two should, in any given case, be employed. When the sun is in front of the operator (that is, in front of a plane through his position at right angles to the line joining the stations) the sun mirror only is required; with the sun in rear of this plane both mirrors should be used. With one mirror the rays of the sun are reflected directly from the sun mirror to the distant station; with two mirrors, the rays are reflected from the sun mirror to the station mirror, and thence to the distant station.

With One Mirror.

Firmly set one of the tripods upon the ground; attach the mirror bar to the tripod; insert and clamp in the sockets of the sun mirror and sighting rod, the latter having the disk turned down. At a distance of about 6 inches sight through the center of the unsilvered spot in the mirror and turn the mirror bar, raising or lowering the sighting rod until the center of the mirror, the extreme point of the sighting rod, and the distant station are accurately in line. Firmly clamp the mirror bar to the tripod, taking care not to disturb the alignment, and turn up the disk of the sighting rod. The mirror is then moved by means of the tangent screws until the "shadow spot" falls upon the paper disk in the sighting rod, after which the flash will be visible at the distant station. The "shadow spot" is readily found by holding a sheet of paper or the hand about 6 inches in front of the mirror, and should be constantly kept in view until located upon the disk. The screen is attached to a tripod and established close to, and in front of, the sighting disk in such a way as to intercept the flash.

With Two Mirrors.

Firmly set one of the tripods on the ground; clamp the mirror bar diagonally across the line of vision to the distant station; clamp the sun mirror facing the sun to one end of the mirror bar and the station mirror facing the distant station. Stooping down, the head near and in rear of the station mirror, turn the sun mirror by means of its tangent screws until the whole of the station mirror is seen reflected in the sun mirror and the unsilvered spot and the reflection of the paper disk accurately cover each other. Still looking into the sun mirror, adjust the station mirror by means of the tangent screws until the reflection of the distant station is brought exactly in line with the top of the reflection of the disk and the top of the unsilvered spot of the sun mirror; after this the station mirror must not be touched. Now step behind the sun mirror and adjust it by means of the tangent screws so that the "shadow spot" falls upon the center of the paper disk on the station mirror. The flash will then be visible at the distant station. The screen and its tripod are established as described in the single mirror assembling.

Alternate Method With Two Mirrors.

Clamp the mirror bar diagonally across the line of vision to the distant station, with the sun mirror and the station mirror approximately facing the sun and distant station, respectively.

Look through small hole in sun mirror and turn the station mirror on its vertical and horizontal axes until the paper disk on the station mirror accurately covers the distant station.

Standing behind sun mirror, turn it on its horizontal and vertical axes by means of the tangent-screw attachments until the shadow spot falls upon the paper disk on station mirror.

ADJUSTMENT.

824. Perfect adjustment is maintained only by keeping the "shadow spot" uninterruptedly in the center of the paper disk, and as this "spot" continually changes its position with the apparent movement of the sun, one signalman should be in constant attendance on the tangent screws of the sun mirror. Movement imparted by these screws to the mirror does not disturb the alignment, as its center (the unsilvered spot) is at the intersection of the axes of revolution. Extra care bestowed upon preliminary adjustment is repaid by increased brilliancy of flash. With the alignment absolutely assured and the "shadow spot" at the center of the disk, the axis of the cone of reflected rays is coincident with the line of sight and the distant station receives the greatest intensity of light. Remember the distant observer is unquestionably the better judge as to the character of the flash received; and if, therefore, adjustment is called for when the "shadow spot" is at the center of the disk, the alignment is probably at fault and should be loooked after at once. In setting up the tripods always see that the legs have a sufficient spread to give a secure base, and on yielding soil press firmly into the ground. Keep the head of the tripod as nearly level as possible and in high wind ballast by hanging a substantial weight to the hook. See that the screen completely obscures the flash; also that the flash passes entire when the screen is opened. This feature of the adjustment is partially regulated by the set screw attached to the screen frame. The retractile spring should sharply return all the leaves of the screen to their normal positions when the key is released. Failure to respond promptly is obviated by strengthening or replacing the spring.

OPERATION.

825. It is of the utmost importance that uniformity in mechanical movement of the screen be cultivated, as lack of rhythm in the signals of the sender entails "breaks" and delay on the part of the receiver. Dark backgrounds should, when practicable, be selected for heliograph stations, as the signals can be most easily distinguished against them.

To find a distant station, its position being unknown, reverse the catch holding the station mirror and with the hand turn the mirror very slowly at the horizon over the full azimuth distance in which the distant station may possibly lie. This should be repeated not less than twice, after which, within a reasonable time, there being no response, the mirror will be directed upon a point nearer the home station and the same process repeated. With care and intelligence it is quite probable that, a station being within range and watching for signals from a distant station with which it may be desired to exchange messages, this method will rarely fail to find the sought-for station.

The exact direction of either station searching for the other being unknown; that station which first perceives that is is being called will adjust its flash upon the distant station to enable it when this light is observed to make proper adjustments. If the position of each station is known to the other, the station first ready for signaling will direct a steady flash upon the distant station to enable the latter to see not only that the first station is ready for work but to enable the distant station to adjust its flash upon the first station.

Smoked or colored glasses are issued for the purpose of relieving the strain on the eyes produced by reading heliograph signals.

CARE OF APPARATUS.

826. Minor parts of the instrument should be dismounted only to effect repairs, for which spare parts are furnished on requisition. Steel parts should be kept oiled and free from rust. Tangent screws and bearings should be frequently inspected for dust or grit. Mirrors should invariably be wiped clean before using. In case of accident to the sun mirror, the station mirror can be made available for substitution therefor by removing the paper disk. If the tripod legs become loose at the head joints, tighten the assembling screws with the screw driver.

POWERS AND LIMITATIONS OF THE HELIOGRAPH.

827. Portability, great range, comparative rapidity of operation, and the invisibility of the signals, except to observers located approximately on a right line joining the stations between which communication is had, are some of the advantages derived from using the heliograph in visual signaling.

The principal disadvantages result from the entire dependence of the instrument upon the presence of sunlight and that when within range it is an attractive target. The normal working range of the heliograph is about 30 miles, under favorable circumstances, though instances of its having attained ranges many times greater than this are of record. The heliograph can be depended upon to transmit from 5 to 12 words per minute.

Section VI.—The Flash Lantern.

828. The flash lantern is an instrument designed for the purpose of transmitting signals by means of intermittent flashes of artificial light. The flash lantern now issued is the acetylene lantern.

THE ACETYLENE LANTERN.

Description.

829. The complete equipment consists of the following:

1 lantern.
1 generator.
1 tube, rubber.
2 burners (extra).
1 cover glass (extra).
3 cartridges, carbide.
1 pliers, gas, pair.
1 white lead, tube.
1 screw driver.
1 wooden carrying case with strap.

The **lantern** is made of brass. It is provided with an aplanatic lens mirror, 5 inches in diameter, and with a focus of about 3 inches.

The base of the lantern contains a valve operated by a telegraph key which controls the main gas supply from the generator to the burner.

There is also a by-pass, with a screw adjustment, which provides the burner with gas enough for a continuous flame which can be made too low to make a signal but ignites the gas from the main supply when the key is depressed. A ¾-foot burner is used, which produces a flame of about 35 candlepower and a projected light of about 1,900 candlepower.

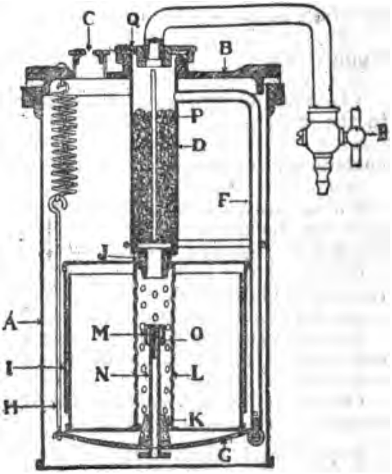
The **generator**, made of brass, is of the water-feed type. Attached to the inside of the removable top is a frame with a flexible spring latch which holds the carbide cartridge.

The **carbide cartridge** consists of a tin-plate cylinder having a circular opening in each end, and a cylinder of wire mesh connecting these openings. The can holds 5 ounces of coarse calcium carbide, which fills the space outside the wire mesh.

The figure on the preceding page gives a sectional view of the generator with the cartridge in place.

D F' G H represents the valve frame and *I* the cartridge attached. The reservoir *A* is filled with water, and when the frame is immersed, with the valve *R* closed, the air contained in the cartridge and tubing can not escape, the water seal preventing, while the confined air prevents the water from rising in the tube *N*. When the valve at *R* is opened and the air is allowed to escape, part of the water from the reservoir rises into the tube *N* and then out through the small hole *O* to the carbide. Gas is immediately generated, the pressure of which prevents further ingress of the water from the tube *N*, and the generator of gas is suspended.

As the gas passes out through the valve at *R* the pressure decreases, permitting the water to again rise in the tube and flow through *O*. Gas is again generated, which at once exerts its pressure and cuts off the supply of water. This is the automatic action by which water is brought in contact with the calcium carbide. Thus it will be observed that the use or escape of the gas regulates the generation by the simple device of the rise and fall of a water column. There is a cap *M* screwed over the tube *N*. This is used to deflect the course of the water downward, so that the carbide in the lower part of the cartridge is first attacked. There is a needle inside of cap *M*, which can be used for cleaning the hole *O*. When the gas is generated it passes through the filter *D* on its way to the burner through *R*. This filter consists of a tube loosely packed with absorbent cotton *P*, which should never cover the escape pipe leading to the valve *R*. In passing through this filter moisture and dust are removed from the gas.



Signal lantern generator.

The escape pipe *F* provides a means for the escape of gas generated and not used, or generated more rapidly than consumed. Should an excess be generated, it passes down through the tube *F*, and, finding its way through some small holes in the bottom of this tube, escapes through the water seal and the opening at *C*. The principal things to observe in the operation of this generator are the following:

(1) To see that the rubber plugs *K* and *J* fit tightly into the openings of the cartridge.

(2) That the tube *N*, the cap *M*, and the water hole *O* are not stopped up.

(3) That the cotton in the filter is changed frequently.

(4) **That the stopcock *R* is closed before inserting the frame in the water.** If this latter instruction is not complied with, it can be readily seen that the water will have free access to the carbide and excessive generation will occur.

When the charge is exhausted, the entire cartridge is taken out and thrown away. This eliminates the handling of carbide and the disagreeable task of cleaning out the residuum after the gas has been extracted.

Connection is made from the stopcock *R* to the hose connection on the lantern proper, and this is the passageway of the gas from the generator to the burner.

One charge of calcium carbide will supply gas to burn about one hour with the light turned on full, or for approximately three hours' signaling.

Complete instructions for the operation and care of this instrument are issued with it.

Powers and Limitations of the Acetylene Signal Lantern.

880. As conditions are usually more uniform at night than in the daytime, the signal lantern is probably, with the exception of the searchlight, the most reliable of all means of visual signaling. The advantages of this apparatus are its portability, speed of operation, and comparatively great range. The principal disadvantages are due to the interference caused by rain, fog, and moonlight. The speed attainable with the lantern is about the same as that attainable with the heliograph. In emergency, and for distances not exceeding ½ to ¾ mile, the lantern can, on dark or cloudy days, be employed for day signaling. These lanterns have been tested up to a distance of 10 miles with the naked eye, and under favorable conditions can be used over a range somewhat in excess of this. With a 30-power telescope the flash can be read a distance of 30 miles.

SECTION VII.—PYROTECHNIC SIGNALS.

ROCKETS.

881. Rockets used by the Army are of two kinds; rockets showing red or white stars and yellow smoke rockets.

Each rocket is supplied in a cylindrical sealed tin can, which also contains a port fire, wind matches, and for the rockets a stick in four sections. On the outside of the can is a label designating the kind of rocket therein contained. These cans are easily opened by pulling a ring and require no special opening tool.

882. When rockets are to be fired the sticks must be firmly attached, the rocket placed upright in a trough, or on a board with guarding nails driven therein. If the fuse is beneath the paper covering the "choke" orifice, the paper should be torn off and the rocket lighted by a port fire. In the rocket now used the fuse extends through the covering and can be lighted direct. If the night be damp, this fuse should be exposed only a moment before the rocket is fired. If several rockets are to be fired in succession, it is well to prepare them all at the same time, and to have them all stood upright, but each separated from the other at a distance of at least 6 feet, else one may ignite the other accidentally. In firing for chronosemic signals, one rocket ought to be kept ready upon the frame and in reserve, to be fired in place of one that fails.

If a rocket misses fire, it is to be taken from the stand and laid on the ground. Its place is at once supplied by a similar rocket, fired in its stead. The falling rocket is laid on the ground, pointed away from the station, in order that if it has only hung and should afterwards ignite it may not disarrange the signal shown or injure anyone of the party. If the wind blows freshly, the rocket to be fired should be inclined slightly against the wind.

Signal rockets should not be removed from the sealed cans until ready for use. Strict economy should be observed in the use of these articles, and on no account should they be used for purpose of display.

883. Rockets are especially valuable in making preconcerted or emergency signals. On account of the great amount of ammunition required it is impracticable to spell out messages with them. These articles should be supplied to outposts and detached stations, to be used for signaling the approach of the enemy, or the happening of unexpected events, which should be known promptly.

VERY PISTOL.

884. The Very pistol is a breech-loading, single-shot pistol, with an 8-inch steel barrel chambered to receive a 12-gauge commercial shotgun shell. Brass shells are used, and are packed in boxes colored to indicate an element of any alphabet or any special signal which may be desired. The stars rise to a height of about 200 feet and remain visible for some time.

The Very pistol projects red, white, and green stars for use at night and the streamer of smoke for use in daytime. The stars can readily be seen several miles at night, and the smoke streamer can be picked up by glasses for over a mile in daytime.

In making a signal the stars are projected deliberately, one by one, from the first to the last, without regard to time intervals. It is desirable, however, that the stars should be projected vertically or so as to fall in the direction of the receiver of the message, and that they should appear without very unequal intervals between them; at the same time, through some unforeseen cause, a long interval may elapse betwen two stars of a message, but no acount of this shall be taken unless the interval is prolonged to about a minute.

A star may be broken by the shock of discharge and show several stars of the same color in the air. This will be recorded as one star.

When, after waiting about one minute, the receiver of the signal sees no more signal stars, he will consider the signal finished.

The Very pistol is used to the greatest advantage in connection with preconcerted signals.

885. For more complete descriptions of visual signaling apparatus, management of visual signaling stations, and instructions for operators of the latter, reference to the Signal Book, United States Army, should be had.

CHAPTER III.—TELEGRAPHY.

SECTION I.—GENERAL.

886. The ability to telegraph by means of the code or codes prescribed for use in their particular organizations is the most important qualification for men of the Signal Corps.

Instruction in telegraphy will be conducted in classes, under the direction of the organization commanders, by competent noncommissioned officers, and, when practicable, under the personal supervision of a commissioned officer. In this instruction the buzzer or sounder will be used and the men will be classified according to ability and progress. Instruction will of necessity be conducted indoors until the operator is sufficiently advanced to work to advantage on field lines, which should be indicated by his ability to send and receive about 15 words per minute under service conditions.

Such men as have no adaptability for operating, or such as are not sufficiently educated, will not be given this instruction.

Instruments will be provided in barracks so that they are accessible to the men at all times. The ambitious will make rapid progress under such circumstances. The prescribed code will be used exclusively.

Opportunity will be given men to use typewriters when they have progressed sufficiently.

THE CODES.

887. The telegraph codes prescribed for use in the Signal Corps are the American Morse and the International Morse or General Service Code.

888. The American Morse Code will be used officially in the operation of land telegraph lines, short cables, and field telegraph lines. This code is therefore used exclusively in official telegraphy in wire and telegraph companies. It is written as follows:

The American Morse Code.

Alphabet.

A	•—	O	• •
B	—•••	P	•••••
C	•• •	Q	••—•
D	—••	R	• ••
E	•	S	•••
F	•—•	T	—
G	——•	U	••—
H	••••	V	•••—
I	••	W	•——
J	—•—•	X	•—••
K	—•—	Y	•• ••
L	———	Z	••• •
M	——	&	• •••
N	—•		

Numerals.

1	•——•	6	••••••
2	••—••	7	——••
3	•••—•	8	—••••
4	••••—	9	—••—
5	———	0	———

Punctuation.

Period		••——••
Comma		•—•—
Interrogation		—••—•
Hyphen	(HX)	•••• •—••
Dash	(DX)	—•• •—••
Parenthesis (begin)	(PN)	••••• —•
Parenthesis (end)	(PY)	••••• •• ••
Quotation marks (begin)	(QN)	••—•—•
Quotation marks (end)	(QJ)	••—• —•—•
Dollar mark	(SX)	••• •—••
Decimal point		Spell "dot."
Capitalized letter	(CX)	•• • •—••
Brackets	(BX)	—••• •—••
Colon	(KO)	—•— • •
Semicolon	(SI)	••• ••
Underline (begin)	(UX)	••— •—••
Underline (end)	(UJ)	••— —•—•
Colon dash	(KX)	—•— •—••
Colon followed by quotation	(KQ)	—•— ••—•
Exclamation point	(!)	———•
Fraction bar	(/)	•
Paragraph mark	(¶)	————
Pounds, sterling	(£)	(PX) ••••• •—••
Shilling mark	(UT)	••— —

Abbreviations.

af	after	nite	night
ahr	another	nl	night letter
b	be	npr	night press rate
bf	before	ob	official business
bn	been	pd	paid
ck	check	r	are
cn	can	t	the
da	day	u	you
dl	day letter	ur	your
dpr	day press rate	w	with
fm	from	wrd	word
gn	good-night	x (in check)	get a reply to this message
govt	government		
hr	hear or here	5	Have you anything for me?
hv	have		
msg	message	13	Understand

Conventional Signals for Use with the American Morse Code.

839.

Attention, all operators	(9)	— • • —
Please start me (or) where shall I start	(4)	• • • • —
Wait a moment	(MIN)	— — • • — •
Official message	(OFM)	• • • — • — —
I understand	(OK)	• • — • —
Busy on other wires	(25)	• • — • • — — —
No more	(NM)	— • — —
Test, give away	(WIRE)	• — — • • • • • •
Break	(BK)	— • • • — • —
Go ahead	(GA)	— — • • —
Error	(DN)	— • • — •
Signature follows	(SIG)	• • • • • — — •

Transmission of Field Messages by American Morse.

840. The sending operator will enter the time **when the message is handed him for transmission**, in the upper left-hand corner. He will enter in the proper places, at the head of the blank, the number of the message, the call letter of his station, with his personal signal, the check (number of words or groups of cipher contained in message **counting address and signature**), and after "O. K." has been received he will enter the time the message was sent and the call letter of the receiving station, with the personal signal of the receiving operator.

To transmit a message the operator will send (1) the number of the message and call letter of his station; (2) his personal signal; (3) the check; (4) "fm," followed by the name of the sending detachment; (5) "at," followed by the location of the sending detachment and date; (6) "ho," followed by the hour (a. m. or p. m.) message was written; "No." (Sender's serial number); (7) "to," followed by the address in full; (8) period (··——··); (9) body or text of the message; (10) "sig," followed by the signature of the message.

International Morse Code.

841. The International Morse or General Service Code has been previously given. In addition to its use in visual signaling heretofore prescribed, it will be used officially on radio systems and submarine cables using syphon recorders. This code is therefore used exclusively in official telegraphy in radio companies.

842. Base line and depot signal troops will, from the nature of their duties, use both of the above codes officially.

SECTION III.—INSTRUCTION IN TELEGRAPHY.

THE AMERICAN MORSE CODE.

843. The American Morse code consists of seven elements: (1) The dot; (2) the dash; (3) the long dash; (4) the ordinary space; (5) the letter space; (6) the word space; and (7) the sentence space. It is important to remember that the value of the spaces in the code is as great as that of the dots and dashes.

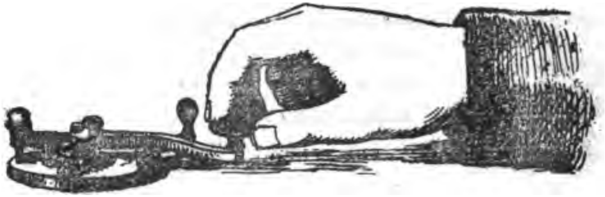
844. The arbitrary unit of time in this code, which when written down becomes a unit of length, is technically termed the dot. An appreciable time is required for the production of signals by electricity, in the magnetization of the electromagnet and in the movement of clockwork. The formation of a dot, therefore, necessarily involves time. Assume, therefore, that—

(1) The dot is the unit of time.
(2) The dash is equal to two dots.
(3) The long dash is equal to four dots.
(4) The ordinary space between the elements of a letter is equal to one dot.
(5) The letter space is equal to two dots.

(6) The word space is equal to three dots.

(7) The The sentence space is equal to six dots.

845. The soldier will first thoroughly commit to memory the groups of signs representing the letters of the alphabet, the numerals, and the principal punctuation points, viz., the period, the comma, and the point of interrogation. The remaining characters can be learned afterwards, as they will be little needed by the beginner.



846. The most approved manner of grasping the key, and one which has been employed by some of the most successful, experienced, and rapid operators, is shown in plate. Curve the forefinger, but do not hold it rigid. Let the thumb press slightly in an upward direction against the knob. Keep the wrist well above the table. No better general direction can be given than that the key will be grasped, held, and controlled with the same flexible but perfectly controlled muscular action of the fingers, wrist, and forearm with which the skilled penman holds his pen. Carefully avoid tapping upon the knob of the key; the raising spring should assist the upward motion of the key, but should never be permitted to control it.

847. By constant drill, as hereinafter directed, the habit of making dots with regularity, uniformity, and precision must first be acquired; then dashes, and lastly, in order, group of dots and dashes, letters and words. In commencing, the habit should at once be acquired of making the dots like short, firm dashes. The beginner should learn to form the conventional characters accurately and perfectly; speed will come in good time, but only as a result of constant and persistent drill.

Elementary Principles.

848. As a basis for practice, the code may be regarded as comprising six elementary principles, viz:

First principle. *Associated dots.*

I S H P 6

•• ••• •••• ••••• ••••••

Second principle. *Associated dashes.*

M 5 ¶

-- --- ----

Third principle. *Isolated dots.*

E

•

Fourth principle. *Isolated dashes.*

L or cipher T

— -

Fifth principle. *Dot followed by dash.*

A

•-

Sixth principle. *Dash followed by dot.*

N

-•

849. The student will first practice upon the above elementary principles.

Make dots with the key at uniform and regular intervals, until they can be produced with the precision of a machine and of definite and uniform dimensions.

Next make dashes, first at the rate of about one per second, which speed may be increased by degrees, as skill is acquired by practice, to three per second. Make the space interval between successive dashes as short as possible. If the upward movement which forms the space be made full, it can not be made too quickly.

The third principle occurs but once, and needs no specific directions.

The fourth principle will be found somewhat more difficult to execute. The usual tendency is to make T too long and L too short. Theoretically, the cipher is one-half longer than L, but in fact it is always made the same, as the practice has been found to occasion no inconvenience. Occurring alone or among other letters, it is translated as L, but when found among figures it is read as 0.

The fifth principle forms the letter A. The usual tendency is to separate the two elements too much.

The dash followed by a dot (N) is usually found to be somewhat difficult. Time the movement by pronouncing the word ninety, sounding the first syllable fully. Guard especially against the usual tendency to separate the elements by too great a space.

850. Having become thoroughly familiar with the principles, the following exercises may with advantage be taken up in order:

E	I	S	H	P	6
•	••	•••	••••	•••••	••••••

These should be practiced repeatedly until the correct number of dots in each character can be certainly made at every trial. A habit once formed of making the wrong number, usually one or two too many in the case of H, P, and 6, is almost impossible to eradicate. Guard especially against the objectionable habit of shortening or clipping the final dot, a vice which leads to innumerable and vexatious errors and misreading signals.

T	M	5	¶
—	— —	— — —	— — — —

The faults to guard against particularly in this exercise are shortening or elongating the terminal dash, and separating the successive dashes by too great a space interval.

A	U	V	4
• —	• • —	• • • —	• • • • -

The usual tendency to allow too much space between the dot and dash in the above letters may be overcome by forming them as by an elongation of the final dot in I, S, H, and P.

I	A	S	U	H	V
- -	- —	- - -	- - —	- - - -	- - - —

Practice these characters in pairs, that the distinction between them may be more firmly impressed upon the mind.

N	D	B	8
— -	— - -	— - - -	— - - - -

The student who has mastered the sixth principle will find no difficulty with the above characters.

A	F	X	,
- —	- — -	- — - -	- — - —

W	1
- — —	- — — -

U	Q	2	Period
- - —	- - — -	- - — - -	- - — — - -

3
- - - — -

These are similar to preceding exercises, and present no new difficulties.

K	J	9	7
— - —	— - — -	— - - —	— — - -

J and K are usually considered the most difficult letters in the code. Avoid the tendency to separate J by a space into double N, and be careful that the dashes are of equal length. The numerals 7 and 9 require some care to insure correct spacing.

O	R	&	C
- -	- --	- ---	-- -

Z	Y
--- -	-- --

These are termed the space letters, and the utmost care and diligent practice are necessary in order to form them accurately. The ability to transmit the spaced letters with absolute correctness is the test of a strictly first-class sender. The space should be just enough in excess of that ordinarily used between the elements of a letter to enable the letters intended to be made to be distinguished with certainty from I, S, and H. The most usual tendency is to make the space too great, even in some cases as great as the space between letters. This is a most fruitful source of misapprehension and error, and too much pains can not be taken to acquire and maintain correct habits in this particular.

Methods of Practice.

851. In transmitting words containing groups of two or more spaced letters, careful operators are accustomed to slightly increase the spacing between successive letters of the group.

Practice in transmission from miscellaneous manuscript is strongly recommended. The ability to read all kinds of copy—good, bad, and indifferent—correctly at sight is a most valuable one, and it is not difficult to acquire by attention and experience.

If the principles here laid down be firmly adhered to, the beginner will find much reason for encouragement not only at the rapidity with which he will master what at first sight appears to be a very difficult undertaking, but the extreme accuracy with which he will be able to manipulate his instrument after a fair amount of practice.

This art can only be acquired by constant and persevering practice, keeping in mind the principles above given.

852. In learning to read by sound, it is advisable for two persons to practice together, taking turns at reading and writing, and each correcting the faults of the other. The sounds of the code characters must first be learned separately and then short words chosen, which must be written very slowly and distinctly and well spaced, the speed of manipulation being gradually increased as the student becomes more proficient in reading.

853. When the operator has made sufficient progress, he will be given instruction in checking messages, the conduct of offices, the care, adjustment, and repair of instruments.

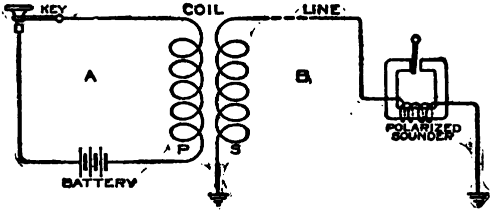
THE INTERNATIONAL MORSE CODE.

854. The principles explained above will, where applicable, be applied to instruction in the use of the International Morse Code.

SECTION IV.—INDUCTION TELEGRAPH SET.

DESCRIPTION.

855. The induction telegraph set is strictly a portable field telegraph instrument. It is designed for sending Morse signals over field lines of communication and other lines where it is difficult to supply the large amount of battery required for ordinary telegraph work. The instrument comprises a wooden case the dimensions of which are 11½ by 7¾ by 6 inches, outside. The top of the case contains instructions for operating. A baseboard, which is removable by means of four screws, has on its underside the wiring and has on its upper surface a battery case of aluminum to hold two Tungsten batteries; an induction coil of the closed magnetic circuit type; a double contact telegraph key of standard pattern; a polarized sounder, which will be described later; a double-pole double-throw switch for reversing the connections to line, and three binding posts numbered 1, 2, and 3. Authority has been issued by the Chief Signal Officer to install a fourth binding post on all instruments in service, to be connected to the contact of the bottom battery. This is for the purpose of attaching external battery to this instrument and for this purpose the batteries in the case must be removed and external battery connected to binding posts 3 and 4. The line is connected to binding posts 1 and 2 as usual. This set can be used for ordinary Morse telegraphy, in which case the line is connected to binding posts 2 and 3, and the small blocking screw which prevents the switch of the key from being closed should be run down with a screw driver so that the switch may be kept normally closed when not sending.



TELEGRAPH INDUCTION SET, THEORY OF OPERATION.

856. Previous models of the field induction telegraph set used a polarized relay of a well-known commercial form and, in addition, required a local battery and local sounder to be connected to the relay tongue. The model 1912 set contains what is known as a "polarized sounder." It consists of a regular local sounder frame, underneath which is mounted a strong permanent magnet, the cores of the coil forming the pole pieces of the magnet. The coils are so wound that a current in one direction tends to increase the strength of the magnet and in the other direction tends to decrease the strength of the magnet. The armature is adjusted by means of a spring so that it remains in either the up or down position when no current is flowing. When an instantaneous current comes over the line due to the depression of the key at the distant station, the direction of winding is such that the magnetism is suddenly increased and the armature is drawn to the down position. It remains there after the instantaneous current has ceased. When the key at the distant station is opened and an instantaneous current in the opposite direction flows through the instrument, the magnetism of the cores is suddenly decreased with the result that the armature flies to the up position and there remains. If the line is not too long nor of too high a resistance and particularly if there are not too many instruments in series on the line, the sound made by this instrument imitates very closely that made by a local sounder. It may be that the impulses from the distant station will come in reversed, and for this purpose the double-pole double-throw switch is provided which reverses the connection of the sounder to the line. If the signals come in reversed, it is only necessary to turn the switch over when they will come in properly.

857. A discussion of the theory of operation and the circuits of this instrument is found in Signal Corps Manual No. 3.

858. On lines where heavy and continuous operation is required, four No. 6 reserve dry cells should be substituted for the tungsten cells. For especially heavy work seven or eight type V Edison cells or a 3-cell (6-volt) storage battery from any available motor vehicle can be used to great advantage.

DUPLEX OPERATION.

859. The field induction telegraph set may easily be duplexed, following the simple principles of the differential polar duplex system. The only additional equipment required is an artificial line which can be adjusted to have the same resistance and, with long lines, the same capacity as the line itself. For duplex operation the line must be connected to binding post No. 2. The green wire normally connected to outside binding post "U" on the polarized sounder must be shifted to inside binding post "U," and the connecting bar joining inside "U" to inside "D" must be in place. The artificial line goes between outside "U" and binding post No. 1, and the ground is attached to binding post No. 1.

The artificial line for duplex may consist of any resistance box, sliding rheostat, or other variable resistance whose maximum value is equal to or greater than the resistance of the line and distant instrument. If the line has appreciable capacity, as in the case of a long line or one in cable or laid on the ground, a balancing capacity can be constructed on the 2 m. f. condensers used in common battery telephones. They are cheap and easily obtained. Fractions of 2 m. f. can be obtained by putting condensers in series. Close static balance is rarely necessary.

INSTALLATION.

860. In large offices the operators should have in front of them only the local sounder and key. All other apparatus should be in a separate room under charge of an expert. This plan is especially necessary where duplex and repeater sets are installed. In small offices the circuits should be well installed without unnecessary complication, and full instructions for operating and adjusting should be furnished. Operators put in charge of such stations should receive special instruction before assuming charge, as the induction telegraph system is not used commercially at present, in spite of its many advantages.

SECTION V.—THE SERVICE BUZZER.

GENERAL.

861. The buzzer is a portable instrument issued to troops in the field for use in connection with all kinds of lines of information. It may be used as a telephone or for sending customary Morse or International Morse code signals and for that reason it is specially adapted for field use.

862. When it becomes impracticable to transmit messages telephonically, due to line becoming impaired or for other reasons, the usual telegraphic signals can be transmitted and are received in distant telephone receivers in the form of a high-pitched hum, somewhat similar to radiotelegraphic signals. These signals have been exchanged between two of these instruments after the line wire has been severed, both the ends, however, being slightly grounded.

DESCRIPTION.

863. The instrument may be operated with both covers closed, which is highly advantageous in inclement weather. To accomplish this there is a suitable opening for leading out the cords to receiver and transmitter, and in main cover, directly over the sending key, is a round aperture which is made moisture proof by means of a covering of extremely flexible pigskin. The sending key can be readily operated through this flexible pigskin.

864. The instrument is contained in an aluminum case fitted with a hinged cover, both of which are covered externally with a russet-colored, smooth-finished leather, which is neatly sewed and riveted in place. The over-all outside dimensions of the case are approximately 3¾ by 5¼ by 7½ inches. The two units of tungsten type A battery are contained in a chamber located in the bottom and are accessible without opening main cover, there being an additional small hinged cover in one end of the case, which is fastened securely when closed by a substantial spring clip and by a flap of leather.

865. The sending key, induction coil, condensers, plug jack, transfer switch, vibrator, and binding posts for transmitter and receiver cords are mounted upon a common base of hard rubber. Wiring to the component parts is routed in the under side of this base, which is mounted in the front of the case above the battery chamber previously mentioned. In the rear of the instrument is a compartment of leather for containing the transmitter, receiver, and cord for connecting them. At one end of this chamber, neatly mounted on a hard rubber strip, is a socket wrench for adjusting the nuts which secure the transmitter and receiver terminals, also two screw drivers—one large and one small—which are so constructed that the shanks may be inserted in the end of socket wrench, thereby using socket wrench as a handle.

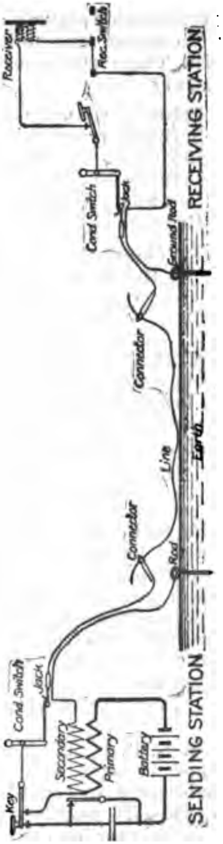
866. There is furnished with this instrument a two-conductor cord, approximately 5 feet long, one end of which is equipped with a substantial plug similar to those used in connection with telephone switchboards. At other end one of the conductors is equipped with a type D ground rod. The Williams test clamp is so constructed that to attach to line it is merely necessary to compress the two principal parts, releasing them when line has been inserted in space provided. One side of this clamp is equipped with an 11-point stud securely threaded to test clamp. These points make excellent contact on line, regardless of whether the line be insulated or not. By this means a quick connection can be made to buzzer wire or field wire which is insulated, and when the clamp is removed the abrasion to insulation is negligible. There is an opening in the case of buzzer through which the plug is inserted when connection is desired, and, when plug is so inserted, it makes a positive connection by means of a substantial jack mounted on the base as previously indicated.

867. The case has an adjustable carrying strap, one end of which is equipped with a snap connection, the other end being sewed to hinged fitting on case. The instrument, including carrying strap, type D ground rod, Williams test clamp, plug and 5-foot cord, weighs approximately 5 pounds, and full directions for operation, together with a circuit diagram, are attached to the inside of main cover.

CIRCUITS.

868. The diagram shows the circuits employed in sending and receiving Morse signals by means of service buzzers. It will be noted that a single conductor is used to connect the two instruments, and that the earth is used for other conductor of the circuit. This is the customary manner of connecting two or more service buzzers in the field.

869. The diagram shows the circuits of the service buzzer. It will be noted that a condenser which can be cut out by means of a short-circuiting switch is contained in the instrument and connected in series with the line. This condenser is for use when it is desired to use an existing telegraph line. Two units of tungsten type A dry battery are used with the service buzzer for furnishing the necessary primary current, both being in circuit when send-



Buzzer, Service, Sending and Receiving Morse Signals, Circuits Employed.

ing telegraphic signals, and one only being in transmitter circuit for telephone communication.

870. The circuits of the service buzzer may be classed as follows:

Primary sending circuit—telegraph.
Secondary sending circuit—telegraph.
Receiving circuit—telegraph.
Primary sending circuit—telephone.
Secondary sending circuit—telephone.
Receiving circuit—telephone.

871. These circuits may be traced as follows, reference being made to the diagram.

Primary Sending Circuit—Telegraph.

872. S. P. D. T. knife switch marked "Sw" must be closed on side marked "buzzer." Upon depressing key "K," circuit is as follows: Positive end of battery, through primary of induction coil, to "A" to "B," contact 1 of key, lever of key, contact 2, vibrator, to negative end of battery.

Secondary Sending Circuit—Telegraph.

873. S. P. D. T. knife switch marked "Sw" is closed on side marked "buzzer." An A. C. current of high E. M. F. is induced in secondary winding of induction coil by interrupted current in primary, and its path is as follows: "G," earth or one side of line (if metallic circuit is used); "receiving circuit, telegraph" of distant buzzer, other side of line, "L," contact 1 of key (key is depressed), "B," "A," other side of secondary winding of induction coil.

Receiving Circuit—Telegraph.

874. S. P. D. T. knife switch marked "Sw" is closed on side marked "buzzer." A. C. current of high E. M. F. reaches "L" from distant instrument by one side of line, contact 3 of key (key raised), receiver, "C," switch marked "Sw," "G," other side of line to distant instrument.

Primary Sending Circuit—Telephone.

875. S. P. D. T. knife switch marked "Sw" is closed on side marked "talk," from positive end of battery through primary winding of induction coil, to A, to B, through blade of switch marked "Sw" to C, through push-button switch marked "PB," through transmitter to negative side of one unit of the tungsten type A battery.

Secondary Sending Circuit—Telephone.

876. S. P. D. T. knife switch marked "Sw" is closed on side marked "talk." When sound waves fall upon diaphragm of transmitter an alternating current of high E. M. F. is induced in secondary winding of induction coil. Starting with secondary of induction coil, to G, to earth or one side of line, if metallic circuit be used, through "receiving circuit telephone" of distant instrument, returning on other side of line, to L, through contact 3 of key marked "K," key raised, to receiver, to C, to switch marked "Sw," through blade of this switch to B, to A, to other side of secondary winding of induction coil.

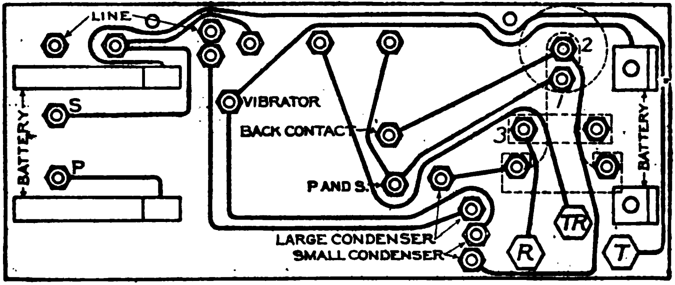
Receiving Circuit—Telephone.

877. S. P. D. T. knife switch marked "Sw" is closed on side marked "talk." An alternating current of high E. M. F. induced in the secondary winding of induction coil in distant instrument reaches buzzer over outside line, to L, thence to contact 3 of key marked "K," to receiver, to C, to switch marked "Sw," through blade of this switch to B, to A, through secondary winding of induction coil to G, to earth or line (if metallic circuit be used), to distant buzzer.

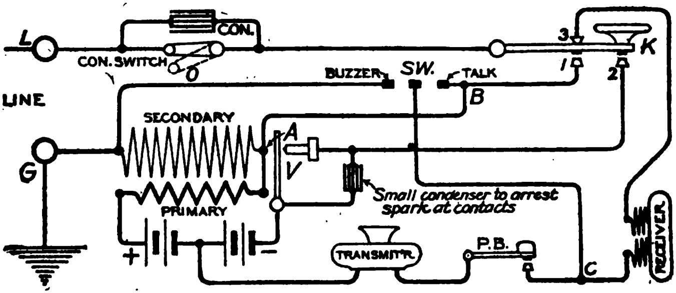
When an existing telegraph line is utilized the switch marked "Con Sw" should be thrown to the O position in order that the condenser "Con" will be placed in the circuit.

SECTION VI.—THE WIRE CART.

878. The means provided for laying field lines is a wire cart, with drums and an automatic gear for picking up the wire when driving back over the line. This is supplemented by carriers for buzzer wire to be used by men on foot or mounted.



BOTTOM VIEW OF BACKBOARD SHOWING WIRING



Buzzer, Service, Circuits.

CARE OF THE CART.

879. Immediately after each drill, maneuver, or other formation, the wire cart will be thoroughly inspected by the chief of section. Notes will be made of necessary repairs, and turned in by him to the company commander. An inspection will be made prior to each formation by the chief of section to see that all the bearings of the cart are clean and oiled, except the clutch, which will be bright and free from oil. He will see that the axles are greased and the harness in repair, that oil cans are full, and that there is no sediment in the holes to prevent the oil from reaching the bearings.

880. Always after the cart has been used the drivers and cart operators will thoroughly clean the chains, friction clutch, and sprocket wheels with a stiff brush and rough cloth, removing all dust, dirt, and hard oil. After cleaning, these parts will be gone over with a well-oiled cloth to prevent rust.

881. Once each week, or when directed by the company commander, the section will be assembled, and, under the supervision of the chief of section, the cart given a thorough washing and cleaning throughout. All dirt and dust will be removed from the woodwork with a broom or stiff brush, and dust and oil from the metal parts with a cloth. Hose will be then used to wash the cart, if available; otherwise pails and sponges will be used. The metal parts will be wiped dry before oiling.

882. Occasionally the friction clutch will be taken apart under the supervision of the chief of section and cleaned with gasoline. A light oil will be sparingly used before assembling to prevent rust.

883. In the field paulins will be placed over the carts after use, and not removed until the cart is again used. These paulins will be folded and placed on the chest when the cart is in action.

MANIPULATION OF THE CART.

884. The manipulation of the machinery of the cart for handling wire will be a part of the duty of the cart driver, unless an operator be placed on the cart, in which case the latter will do this. He will stop the cart at command or signal from the chief of section.

885. The reel will always be stopped before a march to the rear is taken up. In spooling up wire the reel should be stopped when the loop gets too short and the clutch should be thrown in before the loop gets too long.

886. For description and methods of operation of open and closed circuit telegraphy, repeaters, duplex telegraphy, and other technical apparatus not described herein, reference should be had to Signal Corps Manual No. 3.

CHAPTER IV.—RADIO TELEGRAPH SETS.

SECTION I.—THE PACK RADIO SET.

887. Pack radio sets, model 1915, consist of the following units:

- 1 mast.
- 1 hand generator.
- 1 operating chest.
- 1 pack frames, set.
- 1 tent.

888. Each unit contains component parts as follows:

- Mast, type F:
  - 1 top section.
  - 1 bottom section.
  - 8 intermediate sections.
  - 4 intermediate sections, extra (3 for tent).
  - 1 antenna.
  - 1 counterpoise.
  - 9 carriers, wire.
  - 4 pins, antenna.
  - 2 hammers.
  - 1 set adapters for tent (4 pieces).
  - 1 bag, antenna and counterpoise.
  - 1 bag, accessories.
- Hand generator:
  - 1 generator.
  - 2 cranks.
  - 1 stand.
  - 1 speedometer (carried in operating chest).
  - 1 cap for speedometer opening.
  - 1 canvas hood.
- Operating chests:
  - 1 chest.
- Operating chests—Continued.
  - 1 resonance transformer.
  - 1 condenser.
  - 1 oscillation transformer.
  - 1 sending key.
  - 1 spark gap.
  - 1 hot-wire ammeter.
  - 1 switch.
  - 1 receiving set.
  - 1 connecting cord for generator (4-conductor, with plugs).
  - 1 connecting cord, with plug for antenna.
  - 1 double-head receiver.
  - 1 test buzzer.
  - 1 tool kit.
  - 1 extra section for transformer secondary.
  - 1 extra set crystals.
  - 1 canvas case for receiver.
  - 1 connector, 4-wire (lower half), generator.
  - 2 connectors, 2-wire (lower half, antenna and counterpoise.

Operating chests—Continued.

- 1 flexible connector for antenna inductance.
- 1 connector, 2-wire, small, for receiving set.
- 2 spring hooks.
- 4 legs for chest.
- 1 copy "Radiotelegraphy" (S. O. Cir. No. 1, 1914, revised October, 1916).

Pack frames, set:

- 3 frames (1 set). Each frame is complete with cincha, 2 straps with snap hooks, and 2 plate staples.

Tent:

- 1 tent.
- 14 pins.
- 2 guy ropes.
- 1 insulating device.

SECTIONAL MAST.

889. The type F mast equipment consists of 14 sections, each 4 feet 2 inches long, or 5 feet 2 inches over all, including the coupling tube. The 10 sections are used for the mast itself, 3 sections for the shelter tent when erected, and 1 extra section for use in case one of the others becomes unserviceable.

When starting to erect the mast, the four antenna wires and guys should be laid out on the ground at right angles to each other and the umbrella insulator put on the upper end of the section that is not provided with a coupling tube. This section should then be raised and eight more sections with coupling tubes added, section by section, the tenth and last section being the one provided with the insulator fixed at the bottom end. During the erection, the mast should be kept as nearly vertical as possible by the men holding the distant ends of the antenna guy ropes. Owing to the liability of the mast to buckle, no attempt should be made to erect the entire mast at one time; that is, by coupling all sections together and raising by means of the guys.

ANTENNA AND COUNTERPOISE.

890. The standard antenna is of the umbrella type with four radiating wires, each 85 feet long, suitably insulated at the open ends and held as nearly horizontal as possible by guy-rope extensions, each 85 feet long, the outer ends of which are made fast to ground pins. The standard counterpoise has four radiating insulated wires, each 100 feet long, laid out on the ground under the antenna wires. Both antenna and counterpoise wires are carried on hand reels, for convenience in packing and quick reeling and unreeling in setting up and taking down the mast.

GENERATOR.

891. The generator is a hand-driven, 12-pole, alternating current machine having an intermittent output of 250 watts at 110 volts and 500 cycles at a speed of 5,000 R. P. M. It is self-excited, the exciting current for the fields being generated by a small shunt-wound D. C. machine, the armature of which is mounted on the same shaft as the alternator armature and the fields in the same relation with the A. C. fields. The exciter has two poles and delivers the direct current at from 110 volts to 150 volts. The whole machine is driven by two handles which must be turned in the direction indicated by the arrow on the top of the generator case and at a speed of 50 R. P. M., the combination gear having a ratio of 1 to 100.

In assembling the generator be sure to place the fiber wheel on the armature shaft and the larger iron wheel on the shaft above, otherwise the armature will not revolve at the desired speed.

A canvas cover is provided which should be kept on at all times when the generator is not in use.

SPEED INDICATOR.

892. A speed indicator is mounted on the upper part of the gear case in sight of the men driving the machine so as to show if it is being driven at the proper speed, at which time the red line on the moving vane coincides with the black index or arrow at the window. The vane is divided diagonally into black and white parts, the white showing if the speed is too low and the black if too high.

In putting the speed indicator in place it may be necessary to turn handles slightly so as to permit the gears to engage.

In case the vane of the speed indicator comes on the underside when the indicator is screwed into place, it can be turned into proper position after loosening the depressed set screw on the threaded part fitting into the case and then tightening the set screw again.

In making the set ready for transportation, the speed indicator should be removed and packed in its proper place in the operating chest and the opening closed with the brass plug provided.

GEARING.

893. The gearing is a combination planetary worm-and-spur type of high efficiency when in proper alignment. The high-speed shafts have ball bearings and the gears run in grease or oil so as to reduce the friction as much as possible. The gears should never be taken apart unless absolutely necessary to replace worn or broken parts and then only by an experienced person. If not properly reassembled, or if the driving gear does not run perfectly true with the worm, undue friction and wear will result, the machine will be harder to turn than before, and the gears will be speedily destroyed.

The gears and ball bearings should be lubricated by a nonfluid oil which must be free from acid and water to prevent rusting. The level should be kept not more than one-eighth inch above the lower edge of the driving worm-gear shaft; if kept above this, the oil will overflow to the lower part of the case and cause trouble and sparking at the commutator and collector rings.

Oil should be supplied through the opening where the speedometer is screwed into place.

With the exception of an occasional addition of oil, the machine should run for months without attention. If the oil becomes dirty, the gearing should be washed out with gasoline and refilled with clean oil without dismantling.

Care must be taken not to start or stop the machine suddenly, as this may strain or break the gears. The machine must not be stopped by means of the handles but only by friction on the flywheel.

OPERATING CHEST.

894. The leads from the A. C. winding on the armature are directly connected to transformer primary by means of one pair of a four-conductor lead. The large plug of this lead is inserted in the socket at the left-hand end of the operating chest. The small plug marked " C " is inserted in the socket on the generator marked "Coil." The remaining small plug marked "K" is put in the generator socket marked "Key."

The key breaks the A. C. field circuit and the load is very small except when the key is depressed.

The aerial is connected to the plug marked "A" in the cover of the chest and the counterpoise to the plug marked "C" in the chest cover. The receiving set is connected through the control switch to the aerial and counterpoise by means of a small plug attached to the receiving set and chest lid.

Connections are made to the oscillation transformer by means of suitable plugs, as follows:

The cord at back of chest near left end is connected to the lower hinge joint of the oscillation transformer by means of a suitable projection extending to the left from this joint. The cord at the left end of the chest is connected to the outer coil of the oscillation transformer to correspond to the desired wave length.

The ground is permanently connected to the lower hinge joint of the oscillation transformer through the control switch and hot-wire ammeter.

The aerial is connected through the control switch to the oscillation transformer by means of the cord at the top of the lid of the chest. When sending on a wave of less than 700 meters, the aerial is connected to the center coil of the oscillation transformer. Where a 700 meters or longer wave is required the loading coil or back coil of the oscillation transformer is connected to the middle coil by a small flexible lead carried in the tool bag. The aerial is connected to the outer turn of the back coil. The coupling is varied in this case by changing the distance between the coils and tuning by varying the number of turns in use.

A reading of from 2 to 2½ amperes should be obtained on the hot-wire ammeter.

Never remove or widen the safety gap on the top of the transformer.

QUENCHED SPARK GAP.

895. The spark gap used in this set is made up of several copper disks separated by mica washers about 0.01 inch thick. Its action is to allow all of the energy of the closed oscillating circuit to be transferred to the open or radiating circuit in a few oscillations, after which the spark is quenched and the circuit is, in effect, open. The activity in the closed circuit having ceased, the open or radiating circuit continues to oscillate at its own period, radiating waves of its own wave length without any retransfer of energy to the closed oscillating circuit, which continues to remain open until a spark breaks down the gap again at the peak of the next alternation.

In order to work at maximum efficiency the quenched-spark gap should be kept cool. It is for this reason that the plates are provided with thin cooling flanges having a large surface exposed to the air and are blackened, a black body cooling more rapidly than one highly polished. If the gaps have become too hot, as by keeping the key closed for a long time, the antenna current will gradually decrease, the loss at times being as much as 40 per cent, so that it is always best to allow the gap to cool before using again.

The gap should not be taken apart to clean its sparking surfaces like an ordinary type of open gap. In general, the more frequently such a gap is opened the more unsatisfactory will be its operation. The explanation is that the repeated opening of the gaps introduces air each time, and that with free exposure to air the sparking surfaces are corroded or pitted, but that when kept air-tight they are worn smooth and clean by the sparking action. Sometimes, if there is a flaw in one of the plates or if air leaks into the gap, there will be a noticeable drop in the antenna current, and the note will become poor. When it is believed that the trouble is confined to one or two gaps it is possible to continue sending without dismounting the whole gap by short-circuiting the bad gaps by means of clips provided for the purpose, in which case as many new gaps must be put into circuit by adjusting the movable clip to the right as were cut out by the short-circuiting clips.

The gap should be dismounted only when the trouble has been located in the gap and it has been found impossible to remedy it by short-circuiting the different gaps in use. The gap should be dismounted by an experienced man, who should clean the surfaces by rubbing them face down on fine emery cloth or paper on a flat surface. It is absolutely necessary that both the bearing surface and the sparking surface be kept true and plane, as shown by a straight edge.

Great care should be exercised in reassembling the gap to set the mica washers accurately on the annular surfaces of the disk and to put on enough tension with the clamping screws to render all of the gap spaces air-tight.

SHELTER TENT.

896. This tent is similar in dimensions and construction to the standard "common" wall tent issued by the Quartermaster's Department, but is made of lighter material and is not provided with ridge pole or uprights. In erecting the tent the extra sections furnished with the mast should be used as the ridge pole and uprights as follows: One hollow section, one plug and one extension piece for the ridge, and one section and one extension piece with spike for each upright.

INSULATING DEVICE.

897. A device is provided for use in insulating the antenna when the shelter tent is used in damp weather, consisting of a square piece of sheet rubber with small marginal holes for lacing into the ventilator at either end of the tent, and a tube attached to the center for admitting the antenna lead. When in use, sufficient slack should be left in the antenna lead to form a drip loop outside of the tent, and if found necessary a piece of heavy insulated wire can be used as a lead-in wire.

PACKING.

898. The set is normally packed on three mules, but in emergency may be packed on two. In normal packing, the first mule carries the generator and six sections of the mast. The second mule carries the operating chest, four sections of the mast, antenna, counterpoise, accessories, bag, etc. The third mule carries the tent, with tent pins and extension pieces folded inside, four sections of the mast flag kit, lanterns, etc. In emergency packing with two mules, the first mule carries the generator and 10 sections of the mast and the second the operating chest, 4 sections of the mast, antenna, counterpoise, and tent.

SECTION II.—WHEEL RADIO SETS.

THE WAGON SET.

899. The wagon sets for issue to radio companies are now being built, but have not as yet been standardized. They are furnished with 80-foot sectional masts and antenna, the same as furnished for the 2 k. w. motor-truck sets below. These sets are very similar to the 2 k. w. Telefunken sets formerly in use, description and operation of which is found in "Radiotelegraphy, 1916."

THE MOTOR TRUCK SET.

900. The Signal Corps has designed and built motor-truck radio sets of 1 k. w. and 2 k. w. size.

901. The 1 k. w. set, complete with supplies and detachment of seven men, weighs about 6,700 pounds, and on an average road is capable of making a speed of from 20 to 25 miles per hour. It carries a 60-foot sectional mast, which can be raised in a few minutes by means of guides on the truck. The antenna is of the umbrella type, with 16 radiating wires each 75 feet long. The counterpoise is likewise of the umbrella type, laid on the ground with 8 wires, each 75 feet long. The transmitting set is of the quenched-spark type, with inductively coupled circuits adjusted to radiate waves of 600, 800, 1,000, and 1,200 meters. The receiving set is of the statically-coupled type similar to that in use in the 1915 radio pack sets, but of larger size and capable of reception of much longer wave lengths.

902. The 2-kilowatt set, complete with supplies and detachment of eight men, weighs about 9,000 pounds, and on an average road is capable of making a speed of 15 miles per hour. It carries an 80-foot sectional mast, which is raised in a manner similar to that in the 1-kilowatt set. The transmitting and receiving sets are likewise similar to those in the previous set, but capable of using much longer wave lengths.

CHAPTER V.—TELEPHONY.

SECTION I.—THE CAMP TELEPHONE.

908. This telephone is a portable instrument developed for use in the field for talking over field lines, testing lines, or for other purposes. It is also used in connection with camp telephone and small-arms target range systems.

It is of local battery type. The battery employed is one unit of tungsten type A.

The instrument is equipped with a 3-bar magneto, employing a special high-grade steel for permanent magnets.

The instrument is made as compact as practicable and is contained in an oak case, 4½ by 7 by 10 inches high. The top consists of a metal hinged cover with circuit diagram on inside, held rigid when closed by a spring snap, which can be readily released by depressing a button. The bottom of case is covered by a flanged piece of metal, the flange projecting approximately one-half inch up sides of case. The case is equipped with a substantial adjustable carrying strap, each end of which is fastened to case by means of hinged metal rings.

This instrument consists of a 3-bar magneto generator, standard ringer, induction coil, aluminum chamber for the single unit of tungsten battery, hook switch mechanism, and a hard rubber block upon which are mounted 2 line binding posts, 3 binding posts for the hand set used with the instrument, and 2 binding posts for external battery if needed. All binding posts are appropriately marked.

The entire apparatus is mounted on a removable aluminum framework. The instrument complete weighs approximately 17 pounds.

The instrument may be operated open or closed, as there is a suitable cord for leading out the 3-conductor cord to the hand set.

The hook switch is so designed that the hook protrudes through the case. When it is desired to transport the instrument it is merely necessary to turn the hook inside. By this arrangement the hook not only opens the battery circuit, but it is also protected.

The aluminum chamber for housing the single unit of battery is equipped with a spring catch so located that when upper hinged piece is depressed to proper position the battery compresses a helical spring, thereby insuring continual contact.

The proper place for the hand set, unless in actual operation, is hanging on the hook, there being a ring on the hand set for this purpose.

SECTION II.—OPERATION OF CAMP TELEPHONES.

904. In ringing have instrument placed so that the generator crank or ringing handle is on the right. This crank will turn off if turned to the left. Do not ring with hand set off the hook. Replace hand set on receiver hook when through talking.

When talking:

(1) See that receiver hook is pulled all the way out. If it is not the circuit is not completed.

(2) Keep receiver close to the ear and the mouth directly opposite the transmitter.

(3) Hold the head in an erect position, thus bringing transmitter of the hand set into the proper position.

(4) Use an ordinary tone of voice and speak distinctly.

Ring off when through talking to inform the switchboard operator or others on the line that the conversation is finished.

If another connection is desired, wait a few seconds after ringing off and ring again as prescribed.

Avoid excitement or a display of ill temper in conversations over telephone lines. In addition to the discourtesy involved there is nothing so conductive to inferior service.

In answering a telephone announce the location of the instrument or the office or detachment which it is serving as well as the name or official title of the person answering, thus, "Headquarters First Telegraph Battalion, adjutant speaking."

Never use the instrument as a seat or otherwise use it roughly.

Never leave the instrument exposed to the weather as connections rapidly corrode under such conditions.

Avoid making extensive repairs to telephone instruments. Report necessity for such repairs to the proper superior or the person charged with their maintenance.

PART VIII.

CARE AND HANDLING OF ANIMALS.

CHAPTER I.—STABLE MANAGEMENT.

THE STABLE PERSONNEL.

905. The stable personnel includes the stable sergeant, the horseshoer, the farrier, the saddler, the drivers of field and combat vehicles, and the stable detail.

906. The stable sergeant has immediate charge of the stable personnel, of the police and sanitary condition of the stable, corral and picket line, and is the custodian of the forage and the stable property. He will keep records of forage, of the property in his charge, and of the animals.

Whenever the stable sergeant is absent, the next ranking member of the stable personnel will assume his duties.

STABLE RULES.

907. A bulletin board will be kept at the stable showing the total number of animals on hand, the number of sick and the number for duty.

A record will be kept of the departure and return of all animals except those participating in habitual formations or duties, and the stable sergeant will satisfy himself that persons taking out animals have proper authority to do so.

Individual men returning from mounted duty or pass will report to the stable sergeant who will see that the horse is properly cared for.

Animals must never be kicked or struck about the head or otherwise abused.

Manure and other refuse must not be allowed to accumulate in or near the stable. It will be disposed of daily in the manner prescribed by the commanding officer.

Stables will be policed daily.

Except at night, when horses are bedded down, manure and urine will be removed at once and not allowed to accumulate.

Smoking in or near stables will be prohibited, and signs to that effect posted.

One or more lights will be kept burning during the night in each stable.

Animals will be assigned permanent stalls, by section in the usual order of their formation. They will be placed on the picket line in the same order. Over each stall will be placed the name and number of the animal and the name of the man to whom assigned.

The presence of unauthorized persons about the stables at any time is prohibited. This applies to men of the organization who have no duties to perform as well as to strangers. The stable sergeant is charged with enforcing this rule.

THE PERMANENT STABLE.

908. In a stable with a loft, ventilation from the top is always insufficient, and the openings in the sides, above the horses, should be kept open except when it is necessary to close those on the windward side to keep out rain or snow.

Doors should be kept open whenever practicable and every precaution taken to have good ventilation.

Entrances to the stable should be protected by bars or lines to prevent the escape of animals.

909. Stall floors should be kept in thorough repair at all times. If of wood, broken planks must be immediately replaced and spikes kept driven well into the wood. If of dirt, only clay should be used. Gravel, ashes, or sandy earth is not suitable.

The sloping of the stall floor from the manger is injurious and uncomfortable for the animal, causing him to stand in an unnatural position with the forelegs higher than the hind ones. It is natural for a horse to paw a hollow for his front feet so that he can stand with his hindquarters elevated.

Fresh clay will be kept on hand and all holes in the floor promptly filled and tamped.

910. Saddle and harness rooms will be kept clean and their contents assigned to places and kept in order.

THE CANTONMENT STABLE.

911. In permanent or semipermanent camps cantonment stables are built when practicable. They are usually sheds without sides, wide enough for a double row of stalls. The double stalls should not be less than 9 feet wide by 10 feet deep.

Ample ditches should be dug back of the stalls. All rules for the management of the permanent stable that are applicable apply equally for the cantonment stable.

THE PICKET LINE.

912. Permanent picket lines of 1¼-inch manila rope or of ¾-inch steel wire cable are erected near every stable, to which animals are tied for fresh air, for grooming, and to permit the stable to be cleaned.

The picket line supports should be posts not less than 6 by 8 inches by 9 feet long, spaced 50 feet apart, the end posts securely guyed. The line is run through the posts. One end of the line should be provided with a means of taking up slack in the line.

913. Shallow trenches should run along each side of the line behind the horses to carry off the rain and the ground upon which the animals stand filled and graded with a slight slope from the line.

914. The picket line ground will be cleaned and swept daily and kept smooth in the manner indicated for stall floors.

915. Troops in camp may have no stable, in which case, animals are cared for entirely on the picket line and in the corral.

If space of ground permits a corral may be built adjoining the picket lines. The corral fence is built from such materials as can be secured.

916. It is a good plan to build a corral fence around and inclosing the picket lines of new organizations. This is also true of organizations having a new lot of animals, or camped close to other mounted commands, thus avoiding the often serious annoyance of lost animals. Such a corral also assists in the prevention of the spread of contagious diseases among the animals.

FIELD PICKET LINES.

917. Field picket lines are carried by all mounted organizations of signal troops while in the field, and are used whenever the troops go into shelter-tent camp. A field picket line, with its pins and sledge, is carried by each wire section on its cart, by each pack radio section on its kit mule, and by other units on their combat transportation.

918. The field picket line is used as a ground line and consists of 1-inch manila rope 45 feet long, into iron rings at each end, 20 feet of ½-inch rope for a reeve rope, two end pins, and a center pin.

The line should be kept taut and the pins driven flush with the ground when possible.

CHAPTER II.—CARE OF ANIMALS.

GROOMING.

919. The grooming is always done at the picket line, except in stormy weather. Stable call is the first call or warning call for stables, and precedes assembly by such interval as may be prescribed. The roll having been called, the company is marched to the horses or stable, and upon arrival there the first sergeant commands, **Commence grooming, by sections; fall out.** The horses are then tied on the picket line, if not already there, and are groomed under the direction of the chiefs of sections. Each man habitually grooms his own horse, except that the horses of the first sergeant and master signal electricians may, at the discretion of the company commander, be groomed by the men of the section to which these horses are attached. Drivers groom the animals assigned to them.

For the purpose of proper supervision in grooming and feeding, the horses of the men not assigned to sections and other supernumerary horses, will be attached to sections.

At stables each man examines his horse's feet. Horses requiring shoeing are reported to the noncommissioned officer in charge of the section, who notifies the stable sergeant.

Each horse should be groomed not less than 20 minutes, and as much longer as may be necessary. When the horses of any section are sufficiently groomed, the chief of section reports that fact to the first sergeant. The section, at the discretion of the company commander, may then lead in, and the horses will be led to their stalls and properly secured under the supervision of the chief of section. Should the officer wish to inspect the horses of any section or of the whole company before they are led in, he will notify the chief of section or the first sergeant, who will then command: **Cease grooming; stand to heel.** When all the horses have been groomed and led in, and the grooming kits put away, the first sergeant will form the company, march it to the company parade, and dismiss it.

If, when the horses are inspected, the officer finds any of them not properly groomed, he will direct that these horses be left at the picket line and groomed under the supervision of a noncommissioned officer detailed for that purpose.

920. The horses's feet are first thoroughly cleaned with the hoof pick. Then take the currycomb in the right hand, fingers over back of comb; begin at the left side at the upper part of the neck, thence proceed to the chest, arms, shoulders, back, belly, flank, loins, and croup in the order named. Then go to the right side, taking the comb in the left hand, and proceed as before.

The currycomb is applied gently and is used only to loosen the scurf and matted hair; it is not used on the legs from the knees or hocks downward, except to carefully loosen dried mud.

Next, take the brush in the left hand and change the currycomb to the right; begin at the head and then the neck on the left side, and proceed in the same order as in currying, brushing also the parts not touched by the comb; on the right side take the brush in the right hand, the currycomb in the left. The principal working of the brush should follow the direction of the hair, but in places difficult to clean it may be necessary to brush against it, finishing by leaving the hair smooth. After every few strokes clean the brush of dust with the currycomb.

Having finished with the brush, rub or dust off the horse with the grooming cloth, wipe out the eyes, ears, and nostrils, and clean the dock. The skin under the flank and between the hind quarters must be soft, clean, and free from dust.

Currycombs, cards, or common combs must never be applied to the mane or tail; the brush, fingers, and cloth are freely used on both. Straw is used when the horse comes in wet from exercise, rubbing against the hair until dry, from his hind quarters up to his head. If very wet, very hot, or very cold, blanket the horse, groom and hand rub the legs; then remove the blanket and groom the body.

FEEDING.

921. Horses should be fed three times a day—at reveille, in the middle of the day, and at night. This rule must be rigidly enforced on the march, the noon grain feed being carried on the horse. A desirable distribution of the grain ration is, for a horse which is getting 12 pounds per day, 3 pounds in the morning, 3 or 4 pounds at noon, and the rest at night. Hay, as a rule, is not fed in the morning; about one-third of the ration should be fed at noon, except on the march, and the remainder at night.

The use of bran once or twice a week is important for stabled horses. In spring or early summer they should be grazed. A lump of rock salt should be kept in each manger.

Before feeding hay it should be thoroughly shaken out with a fork so as to get rid of dust and seed; it is also advisable to moisten the hay before giving it to the horse. The grain, if possible, should be run over wire screens or allowed to fall through the air so as to remove dust.

In the morning the horses are usually fed at or before reveille. The noon feed of hay is usually placed in the mangers while the organization is at drill, but the grain is not fed until the horses are thoroughly cool. The evening feed is placed in the mangers after the stable has been thoroughly policed for the night.

It is advisable that the horses eat at least a portion of the allowance of hay before the grain is fed to them.

All horses do not require the same amount of forage; the amount given each horse must be based, therefore, upon his individual requirements, which should be closely watched by the stable sergeant. When a horse leaves some of his grain, his ration should be reduced that amount. The amount to be fed each horse each meal should be chalked up on a small blackboard placed so as to be easily seen by the men distributing the grain. A convenient arrangement is a board about 12 inches high by 4 inches wide divided by two horizontal lines into three 4-inch squares. In the uppermost square should be marked in pounds the morning feed of grain, in the center square the noon feed, and in the bottom square the night feed. When a horse is sick or injured his grain ration should be reduced to between 6 and 9 pounds per day, depending upon the horse.

When forage can not be obtained grazing should be required at every spare moment, especially early in the morning when dew is on the grass.

All forage received by an organization should be checked for weight and to see that it is up to contract specifications. All officers should be familiar with the characteristics of good forage and the manner in which it is commercially graded for contract specifications. To obtain this knowledge officers should be encouraged to visit large commercial stables.

The daily allowance of oats, barley, or corn is 12 pounds for each horse; that of hay, 14 pounds. The allowance of straw for bedding is 100 pounds per month for each animal.

Good oats weigh about 40 pounds to the bushel; barley, about 48 pounds; corn, about 56 pounds. Pressed hay weighs about 11 pounds per cubic foot.

The standard bushel in the United States contains 2,150.4 cubic inches. A cubic yard contains 21.69 bushels. A box 16 by 16.8 by 8 inches holds 1 bushel; a box 12 by 11.2 by 8 inches holds half a bushel; a box 8 by 8 by 8.4 inches holds 1 peck; a box 8 by 8 by 4.2 inches holds one-half peck, or 4 quarts.

WATERING.

922. Horses must be watered quietly and without confusion; the manner in which this duty is performed is often a good test of the discipline of a mounted command.

Horses are to be led to and from water at a walk. At the drinking place no horse should be hurried or have his head jerked up from the water.

In the field or on the march the watering is from the most convenient running water; in garrison it is usually from troughs, which should be cleaned each day. In warm weather water drawn from a cold well or spring should stand long enough for the chill to pass off.

The horses are watered under the immediate direction of the chief of sections, but if they are liable to meet those of other commands at the watering place a commissioned officer should suppervise this duty.

Horses should be watered before feeding or not until two hours after feeding. Ordinarily they should be watered twice a day; in hot weather three times a day. In very cold weather once a day, about noon, is sufficient. A horse will rarely drink freely very early in the morning.

If a mounted command have to march a long distance without water, so that it will be necessary to encamp en route, the animals are fed, and denied water until just before starting, when they are permitted to drink freely. The command marches in the afternoon and does not encamp until it has accomplished at least half of the distance, and moves early next morning to reach water.

Watering the horses on the march depends in a great measure upon the facilities to be had. If nothing is known as to the country over which the day's march is to be made, water call should be sounded shortly before leaving the camp and every horse given an opportunity to drink. As many animals, however, will not drink at an early hour, or until after exercising, the horses should be watered at the first opportunity. On severe marches frequent watering is of great benefit.

The daily allowance of water for a horse at rest is about 6 gallons; when at work, from 8 to 12 gallons; for a man, 1 gallon for all purposes. One gallon of fresh water weighs 8⅓ pounds, approximately 1 pint to 1 pound.

SICK ANIMALS.

923. The animals on sick report are in charge of the stable sergeant, who reports daily to the captain for instructions as to their treatment.

The sick animals are inspected daily. The names of the animals on sick report, and the treatment they receive, are recorded daily in the sick book.

In treating sick animals, it is to be observed that very little medicine is ordinarily required, and that unnecessary doses do a great deal of harm.

If an animal sustains an injury, neglects his feed, refuses to drink, or gives any evidence of sickness, it will be at once reported.

No animal on sick report will be taken from the stable or picket line for exercise or work without permission from proper authority.

924. If there be at any time a suspicious discharge from one or both nostrils of an animal, it must be immediately reported.

To prevent contagion to man or beast, an animal that shows any decided symptom of glanders is to be isolated at once, and confined or tied up in some locality where no other animal can approach him.

925. A glandered animal should be killed as soon as possible. The stall in which he stood is torn down and all the woodwork burned and the ironwork disinfected, or otherwise it is closed, and must remain empty until the rack, manger, and every part of the iron and wood work, as also the vessels used in watering and feeding, and his saddle and bit have been three or four times thoroughly washed with a 5 per cent solution of carbolic acid or a 1 to 1,000 solution of corrosive sublimate; all parts to which the latter has been applied should be thoroughly scrubbed with hot water to remove all traces of the poisonous salt. The application of a lime wash to all the stalls, after complete disinfection, will be desirable. Small articles, such as bits, etc., can be disinfected by keeping them immersed for a half hour in boiling water. All articles of little value that have been used with a glandered horse, such as halters, bridles, horse cloths, saddlecloths, blankets, nose bags, currycombs, brushes, etc., should be destroyed.

Stables occupied by infected or suspected horses should be disinfected daily by washing exposed surfaces with a 5 per cent solution of carbolic acid, and nose bags, halters, buckets used for drinking water, etc., should be carefully washed with the same solution or with boiling water.

926. Drugs and dressings sufficient, under ordinary conditions of field service, for 100 animals for one month:

Boracic acid: 4 ounces, saturated solution, for disinfection of wounds of eye and vicinity.
Carbolic acid: 16 ounces. A solution of 1 ounce to 1 quart of water to disinfect wounds of body.
Alcohol: 1 quart; 2 ounces in pint of water as a quick stimulant.
Aloes: 20 ounces; 1 ounce as a cathartic; ½ ounce to pint of water stimulates wounds.
Alum: 4 ounces; ½ ounce to pint of water acts as a nice stimulant to wounds.
Ammonia, aromatic spirits of: 16 ounces; 2 ounces in pint of water a quick stimulant.
Ammonia, solution of: 8 ounces; used to make liniments.

Cannabis Indica: 16 ounces; ½ ounce to the dose in cases of colic to relieve pain.
Charcoal: 8 ounces; used to dust on exposed wounds.
Cosmoline: 2 pounds; used to make ointments.
Creolin: 1 pound; 1 ounce to quart of water as a disinfectant for wounds.
Ether, nitrous: 16 ounces; 2 ounces in pint of water as a stimulant.
Iodine crystals: 2 ounces, with which to make a saturated solution or tincture for application to sprains.
Copper sulphate: 1 ounce, to cut down granulations (proud flesh).
Mercury, bichloride tablets: 1 ounce; 1 tablet in pint of water as a disinfectant for wounds.
Olive oil: 1 pint, with which to make liniments.
Turpentine: 1 pint, to make liniments.
Tar, oil of: 4 ounces, with which to make ointments.

Dressings.

Absorbent cotton: ½ pound, for eye pads.
Antiseptic gauze: 1 package, for dressing of wounds.
Oakum: 3 pounds, to be used in dressing wounds.
Red flannel bandages: 1 dozen.
White cotton bandages: 2 dozen.
Silk thread: ¼ ounce.
Soap, castile: 1 pound.
Sponges: 4, small.
Adhesive plaster: 1 roll.

Instruments.

1 farrier's case.
1 thermometer.
1 twitch.
1 drenching bottle.
4 small bottles and corks.
1 tin basin.
2 quart bottles and corks.
30 sheets tissue paper.

A liniment: Olive oil, 3 ounces; turpentine, 2 ounces; ammonia (solution of), 2 ounces. Mix well. Apply with slight friction.

A stimulant: Aromatic spirits ammonia, 2 ounces; alcohol, 1 ounce; water, 16 ounces. Mix. Give as a draught.

A good dusting powder for wounds: Air-slaked lime, 16 ounces; powdered charcoal, 2 ounces. Mix. Dust on open wounds.

An ointment: Oil of tar, 1 ounce; creolin, ½ ounce; cosmoline, 6 ounces. Mix.

CARE OF SADDLE HORSES.

927. In order to keep saddle horses in condition they must be fed and worked properly and the greatest care exercised in preventing sore backs.

They must be well groomed and their feet kept in good condition.

Blanket.

928. The blanket should, if possible, be kept dry and free from sand, caked dandruff, and hairs. It should be frequently shaken out and well switched, if necessary, to restore its pliability and remove dust and hair. In warm weather, when the animal sweats freely, a fresh, clean bearing surface on the blanket should be placed next to the back.

It is not a good plan to dry the sweat-soaked surface of a folded blanket in the sun and put this dried surface next the back the following morning. Such drying hardens the dandruff mixed with sweat and dust that is always present, and makes this part of the blanket rough and hard. It is preferable to double the sweat-soaked folded blanket on itself, so it will remain moist and soft.

Before placing the blanket on the back, be sure that both are free from sand and dust, and that the mane lies properly. Place the blanket in position in such a manner that it will not disturb the mane or ruffle the hair of saddle bed, and be sure there are no wrinkles in any of its folds.

Saddle.

929. It is of importance that the saddle fit the rider as well as the horse.

A saddle too large for the rider may not be objectionable, if stirrups are of the proper length, but a saddle with too small a seat causes the rider to place undue weight over the cantle arch. This uneven distribution of weight causes the rear of the bars to bore into the muscles of the posterior portion of saddle bed and to induce "cantle sores," or so-called "kidney sores."

A saddle too large for the animal may press on the thinly covered ribs when he becomes low in flesh. Doubling the blanket will not save him from the inevitable gall. As such a saddle sits lower on the back as the animal's condition becomes low, the pommel arch will, if withers are high, cause contusion there, and may produce a fistula.

In selecting a saddle, secure one that will not be too large for the animal when he becomes thin, and that will not be too small in the seat to properly accommodate the rider.

Saddling.

980. There is no hard and fast rule for placing a saddle in position on the back. The saddle place is determined by the animal's conformation, and will sooner or later, during the morning, take that place irrespective of tight cinching. On backs of good saddle conformation, however, the saddle if too tightly cinched may interfere with the free play of the shoulder blades when placed too far forward in the first instance, and may remain for a sufficient length of time in this objectionable position to cause lameness by the irritation of the muscles that run from the upper part of shoulder to the bones of the arms.

The saddle should not be placed too far to the rear, for two reasons: First, on most backs it causes it to tilt forward and bore into the muscles back of the withers; second, this position brings the cincha back on the "floating" ribs, where it will compress them, thus interfering with the proper expansion of the lungs.

The saddle being placed in the proper position, determined by the conformation, and on the blanket, which should be without the suspicion of a wrinkle, the rider should see to it that all straps, buckles, and lashings are free of the bars, that the bars rest only on the blanket, and that the pack on pommel and cantle does not rest on the withers nor the back.

It should now be seen to that the quarter straps are evenly adjusted, and that there are no wrinkles or rough places on the ring safes.

Cinching.

981. The cincha should not be unduly tightened. Tight cinching causes young animals to rear and even throw themselves. It induces local swellings and galls, by interfering with the circulation, and it teaches all saddle animals to inflate the lungs ("swell themselves") the moment they feel the touch of the cincha. On cold mornings tight cinching causes even old saddlers to buck.

Take up the cincha gently and draw it snugly, then secure it temporarily. Adjust your stirrups and see that they are of equal length. This can be judged by standing in front of the animal and comparing one with the other. It will be found that from the often repeated mounting and dismounting on the near side the stirrup leather of that side will usually be found longer than the other. Having adjusted things generally, return to the cincha and take up the slack that will now be found, draw it snugly but not tightly, and secure it, being careful that there are no wrinkles in the strap and that the cincha itself does not encroach on the quarter strap ring shield. If it does, either the cincha strap is too long on the off side or the cincha is too long. In either event, make the necessary correction at once if possible. If this correction is not made soon, a gall may be expected.

Unsaddling.

982. On arriving in camp and having dismounted, ease off the cincha about 3 inches and change the bearing of the saddle by moving it to rear or front at least an inch. Allow the saddle to remain on the back for 10 minutes, to enable the almost bloodless skin beneath (caused by weight of yourself and pack) and the tired saddle bed muscles to regain to some extent their lost tone, while you busy yourself about the bridle and halter, and the religious duty of closely examining the feet for loose shoes, rocks, nails, bruises, thrush, and interfering sores. Now remove the saddle, turn over the blanket, and let that remain in place until the back has dried.

983. If any dry spots are noticed on the sweaty skin while the blanket is being turned over, remember they are inflammations of the skin, produced by unequal distribution of weight, and are liable to puff up later if not attended to. Mark their location well, for you are close to the walking stage if you neglect them. When the back is dry, remove the blanket and take care of it. Massage well from front to rear the spots referred to, bathe the saddle bed with clean water, dry it, and let the animal roll if he will. Should small swellings appear, however, keep the blanket in place until a soaking wet gunny sack is procured. Now remove the blanket, massage the swelling vigorously, and put the wet folded gunny-sack pack over the back and secure it there. Do not allow the animal to roll if it can be avoided, and keep the pack wet during the night. In the majority of cases the animal will be ready for careful saddling in the morning.

984. Should you have produced a gall, the place should be bathed and disinfected with a creolin or carbolic-acid solution (1 ounce to the quart of water), the spot protected from the flies, cold-packed if necessary, and the animal led until nature effects a cure. Close attention to cleanliness, disinfection, and stimulation of the wound will hasten the process. Use a solution of aloes or alum in water (one-half ounce of either to a pint of water) as a stimulant.

985. Even with very close attention to saddling, galls may be produced if the rider is not a careful one.

Irrespective of the fit of the saddle and condition of blanket, the things that cause galls and "bunches" most frequently are carelessness in balancing and securing the pack, a lounging, shifting seat, and a sloppy method of handling the reins, inattention to proper cinching, unequal length of stirrups, neglect of adjustment at the halts, the riding of a lame animal, and the galloping of a leg-weary one.

Bitting.

986. Use a snaffle in preference to a curb, and adjust it so that it will not elevate the corners of the lips. When a bit and bridoon are used, let the bit hang somewhat lower than the bridoon. Adjust the curb strap or chain properly, and be sure that the animal is comfortably fitted.

The inside of the lower jaw is often injured by ignorant handling of the curb rein. These injuries appear above the bridle teeth or "tusks" and present inflamed places that sometimes exhibit ulcers. Quite often the bone is splintered. Less frequently the under part of the jaw, in the vicinity of the curb groove, is bruised and perhaps fractured more or less completely.

Any of these conditions may be made manifest by the animal "fighting the bit," "throwing the head," or rearing.

937. These injuries should be treated by putting the animal on a shaffle at once and placing it high enough in the mouth to avoid any pressure on the injured parts. If ulcers appear, wash them out frequently with a saturated solution of boracic acid. When the bone is splintered it is usually a serious matter, and the parts should not be interfered with by the inexperienced.

CARE OF DRAFT ANIMALS.

938. Constant and intelligent supervision of adjustment of the bearing parts of harness, packs, and saddles is productive of better results than medication in keeping transportation animals in serviceable condition.

Animals in a command lose flesh rapidly for the first 10 days of a march, and during this period the adjustment of all parts of the harness, more especially the collars, should be given close attention.

939. Water on the march whenever a good opportunity to do so presents itself, never forgetting, however, that a warm animal should be watered but sparingly, and that such a watered animal should not be allowed to remain stationary even for a few minutes, as this induces laminitis (founder), due to contraction of the internal blood vessels by the cold water taken and the consequent increase of blood pressure in the legs and feet where it can not, while the animal is inactive, be taken care of by the system. Laminitis (founder) is due to congestion of the feet.

940. Feed soon after reaching camp, offering a little hay. Water before feeding grain when possible. Offer grain immediately after watering, and then place before the animals what remains of the hay for that day. The morning water must of necessity be governed by circumstances. If absolutely sure of water on the road, say one hour after breaking camp, it would be a needless waste of time and energy to water immediately before or after the morning feed on the line.

941. Collars of steel, such as those furnished to artillery commands, are preferable to leather for military use, when properly adjusted and cleaned. When improperly adjusted they are inferior to the leather article. Steel collars are adjusted by means of bolts and plates. Leather collars by means of top straps and hames. When these methods will not produce the desired results, the use of collar pads must be resorted to. Felt collar pads are not desirable, as they soon become stiff and hard.

A collar should fit snugly to the sides of the neck without compressing it, and its bearing surface should rest squarely on the bed of muscles situated on the front of the shoulder. When in position there should be a space between its lower part and the windpipe sufficiently large to comfortably admit the insertion of the open hand, back up, as far as the wrist.

All collars should be furnished with a neck plate of zinc, for the protection of the top of the neck against rubbing.

To prevent blistering of the top of the neck on hot, sunny days it will be found that a wet sponge or a wet piece of folded gunny sack, properly secured to the top of the collar and wetted at intervals, is effective.

The bearing surface of steel collars and neck plates should be washed carefully soon after making camp. They should never be scoured with sand or rubbed with an abrasive substance, for the reason that the steel beneath the zinc plating may be thus exposed. The exposed steel rusts quickly, pits rapidly from the action of the acid sweat, and acts as a rasp would on the soft tissues with which it comes in continual contact.

The bearing surface of leather collars should not be scraped unless considered absolutely necessary to remove accumulated dirt due to negligence. If scraped they should be boned smooth and then slightly oiled. Leather collars may be easily cleaned with a damp sponge. They should be thus cleaned each evening. A careful man will not let his collars remain on the ground over night, but will hang them on the pole, or put them in some safe place where he will protect them from the rain and the dust of the camp.

942. On arrival in camp let collars remain in position for about 15 minutes. Their weight on the hot, tender skin affords sufficient pressure to prevent the formation of swellings so often observed after the collar is suddenly removed. Normal circulation will establish itself gradually under collar pressure alone, and the skin of the shoulders and neck will regain its tone and elasticity.

After removal of the collar, bathe the shoulder and neck with clean water; this to remove sand and dust that would otherwise remain in the hair, where it may not be reached by the horse brush.

Salty water, or a weak solution of vinegar in water, when applied to the shoulders and neck, acts as a tonic to the jaded skin.

Animals with narrow, lean shoulders should not be placed in the collar. For these, if they must be harnessed, a breast strap (Dutch collar) should be used.

When putting on a collar, see that the mane hangs naturally beneath the neck plate. If the collar is a steel one, be careful when snapping it in place that the skin of the upper part of neck is not pinched between the neck plate and the collar itself.

If swellings appear on the shoulders, use massage to remove them and in addition apply a cold-water pack during the night; a wet sack properly adjusted and held in place will answer the purpose. If a gall appears, do not grease it. Wash it with water and soap, dry thoroughly, and apply a weak solution of alum (one-half ounce to a pint of water) or a solution of aloes in water (one-half ounce to the pint). If the animal must be worked, use a chambered (cut-out) pad over the spot to remove pressure. Greasy ointments serve as a trap for dust and sand.

943. Verify the length of traces frequently. Do not depend on the chain links as a guide in hitching. Leather traces stretch considerably in wet weather. A difference of half an inch in the length of traces will cause trouble on the shoulder of the shorter side. It is also liable to produce lameness due to irritation of extensor muscles. If the point of attachment of the trace to the collar should be too high, it will cause a downward pull on top of neck, with its consequent irritation. If too low, it will cause the collar to "ride," and nearly all the pressure will be on the point of the shoulders and on the windpipe.

The number of sore-shouldered draft animals in a command on the march is an excellent standard by which to judge the horsemanship of the personnel.

944. The breeching should be fairly loose; otherwise it is liable to chafe the quarters and to interfere with the free play of the muscles. It should be taken up as the animals become thin.

Martingales should not fit too snugly, as they are very liable to chafe the soft, thin skin of the under part of the body.

945. Yoke straps should be adjusted with a view to the height of the pair. They should never be permitted to trespass on the bearing surface of the collars.

946. Backstraps should be so adjusted as not to let the saddles ride the withers, but at the same time there should not be sufficient strain on them to cause the crupper to irritate the under part of the tail.

947. Bellybands and cinchas should never be unduly tightened, as they cause cinch sores near the elbow, and quarter-strap sores beneath the ring shields.

When a cinch gall appears, remove the cause, keep the place clean, and apply a solution of aloes or alum in water. Either of these will stimulate the gall and deter insects from alighting on the wound.

948. Bearing reins should be of such a length that the animals may have free use of the muscles of head and neck. Bearing reins are not a necessity.

949. A driving bit should be smooth and jointed. It should be so adjusted that it will not lift the corners of the mouth. If placed too high in the mouth, the animal uses his molar teeth to press against it, and gains for himself the reputation of a hard-mouthed puller.

950. Beware of thread ends in collar pads and of knots in headstalls, throatlatches, bellybands, cinchas, and surcingles, and be careful that buckles are not turned toward the skin. These readily produce irritations and abrasions, and are plain evidence of negligence and carelessness on the part of the rider or driver, as well as loose supervision on the part of those superior in rank.

951. To keep his animals in the collar and off the lead line should be the aim of each driver. This can be accomplished with little trouble, barring accidents, if the harness is kept in proper shape and fit, and necks and shoulders are kept clean.

CARE OF PACK MULES.

952. The pack mule should be between 14 hands and 1 inch and 15 hands in height. He should be of a chunky build, possessing a strong, fairly straight, well-shaped back. His withers should not be high, nor sharp; neither should they be low enough to slope the back to the front. His weight should be in the neighborhood of 975 pounds.

Too small an animal will not "stand up" under the usual pack load of 250 pounds.

Too tall an animal will be inconvenient to pack, as the cargo must of necessity be elevated by one man on each side of him.

953. The disabling conditions, caused by the aparejo, to be guarded against are bruised withers, galled elbows, belly sores, crupper galls, and loin and back sores.

Contusion of withers is the result of undue height of same, too narrow or too wide a collar arch, lack of sufficient stuffing in front under arch, improperly balanced top load, defective conformation of animal, and drifting of aparejo. Contusion of withers is a serious matter. The pressure should be removed at once, and the entire withers covered with a cold-water pack. A folded gunny sack, kept well saturated with water and secured in place, will produce good results in allaying inflammation. If a fistula should form, usually indicated by a running sore, the animal, as a rule, becomes unfit for pack purposes thereafter.

Galled elbows are due to contact with the cincha. When a properly adjusted cincha infringes on the elbow and produces galls, it shows that the aparejo has been placed too far forward, or that the animal's conformation is defective ("soldier toed"). Packers generally adjust the aparejo so that the cincha passes about 1½ inches behind points of elbow.

Treatment of elbow galls consists in freeing them of the irritating cause and keeping them clean. They heal rapidly.

Crupper galls, in open country, indicate that the aparejo is either too long or too short. If too long it will wrap around the chest to some extent and develop a tendency to drift forward, thus putting undue strain on the crupper. Should the aparejo be too short it will be defective in body grip, and will shift from side to side, especially with a top load. This swaying will cause the crupper to act as a saw. Should a properly fitting aparejo cause crupper galls, they may be traced to too tight lacing of the latter, or by too much stuffing of the aparejo in the boots. The overstuffing near the boots weakens the grip on the body.

Treat crupper galls by proper adjustment of aparejo, thorough cleaning of wounds, and the application of a solution of aloes in water (one-half ounce to the pint). If these galls are severe, wash, after cleaning and before applying the aloes, with a creolin solution of 1 ounce to the quart of water.

Loin or kidney sores are due to the aparejo drifting to the rear, an unusual condition except in hilly country; or to placing it improperly on the back and holding it there by means of the crupper, or by the unequal distribution of the cargo.

These kidney sores readily respond to treatment when the cause is removed. A cold-water pack (wet gunny sack) soon relieves the inflammation.

Belly sores are the result of too tight cinching. The fit of the aparejo has considerable influence on the cinching, for should the aparejo flare at the boots from overstuffing, it will not conform to the shape of the animal, and undue cinching will have to be resorted to to hold it in place. With very tight cinching a patch of skin on the under part of the chest may have its circulation entirely stopped; in such an event a piece of dead skin may come away when the cinch is taken off and leave a nasty wound. Proper size of aparejo and proper "ribbing" and stuffing should be the preventive. Cleanliness, disinfection, protection from dust and flies, and the application of a weak solution of aloes or alum in water (one-half ounce of either to the pint) will give good results in the line of treatment.

Body sores, galls, and swellings, the most disabling of all aparejo troubles, are caused by the following: Bad conformation, unequal pressure, wrong "ribbing," careless stuffing, imperfectly broken-in aparejo, aparejo too short, aparejo too narrow, careless packing, overloading, and unwieldy top load.

Swellings are due to interference with the circulation of the skin at the particular spot, for at that spot the extreme pressure lowers the tone of the small blood vessels, which, when pressure is suddenly released, become engorged with the constituents of the blood, and remain so engorged until the tone is regained. If the tone should not be regained the swelling will persist, the skin there will mummify and a sitfast or callous will form. Should the circulation be entirely stopped and the small blood vessels become paralyzed, a patch of skin will slough off (mortify) and leave an angry-looking wound more or less deep.

Simple galls are due to rubbing or chafing of the part.

954. When putting on the aparejo, see to it that the corona is right side front, clean and smooth, and that the aparejo itself belongs to the animal on which it is put.

On reaching camp, remove the cargo, relax the cincha, and allow the cinched aparejo to remain in place for 15 minutes or so, until the circulation of the skin of the back is restored to the normal and the parts under the aparejo become gradually cool. When the aparejo is removed, examine the back for swellings and massage them from front to rear to cause them to disappear. Apply a cold-water pack, if necessary, and keep it wet and securely in place.

Very often fairly large swellings may be reduced by simply putting a dry blanket over the back and immediately replacing the aparejo and cinching it snugly.

When a swelling persists, or when it is evident that there is undue pressure on a particular spot, the aparejo should be chambered on the bearing surface over that spot. Chambering consists in taking out the stuffing at the spot indicated, so as to relieve the pressure. This chambering is done by inserting the hand in the handhole and carefully withdrawing the stuffing at the place selected. To accurately locate the place where the chambering is needed, apply a little wet clay over the swelling and then put on the bare aparejo and fit it into its proper place and roll it slightly from near to off side. The wet clay over the swelling will adhere to the leather and mark the exact spot sought for.

It is the custom in some pack trains to "pack out" the "bunches" by means of light loads. This treatment is effective only when the small blood vessels have not entirely lost their tone. Where a sitfast or callous forms, or where a slough takes place, there is no simple remedy to take the place of the operation and energetic treatment indicated.

The pressure of the unpacked aparejo, massage, and cold-water packing are to be relied on when body "bunches" appear.

In all cases, where practicable, relieve the suffering animal from weight of cargo. A rest of 24 hours may restore him to work.

Wounds of the back should be kept clean and protected from dust and flies.

When it is not intended to carry loads, mules should not be tightly cinched. A pack mule is best kept moving. At halts of sufficient duration the loads should be removed. At longer halts the cincha should be loosened, but only at sustained halts should the mules be unharnessed.

SHOEING.

955. Horses will be shod according to the principles outlined in the authorized manual.

All officers must understand the principles of proper shoeing and be able to supervise the work of the horseshoers.

All mounted men should know how to put on a shoe in an emergency. The following extracts from the manual are therefore here incorporated:

The foot should be prepared so that it will approximate as nearly as possible to a state of nature, and only such trimming is allowed as is absolutely necessary for the purpose of fitting and securing the shoe.

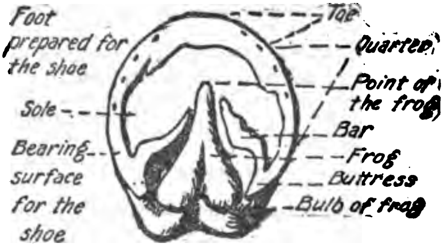
The knife must never be used on the bars or on the frog. The bars strengthen the hoof and assist in its expansion. Cutting, therefore, weakens them and prevents them from performing their function.

The practice of using the knife to trim the bars or to cut a notch at the junction of the frog and bar at the heel (called opening the heels in civilian shops) always tends to produce contracted feet.

Never use a knife on the hoof of a horse that has been running barefoot nor on flat feet.

Ragged parts of the frog may be cut away by careful use of the nippers.

With a flat foot it is frequently necessary to remove a part of the outer edge of the wall in order that the nails may be driven in the white line where they belong. This is the only case where it is permitted to rasp the outside wall. The outer coating of the wall and the layers of dead horn on the sole and frog serve to retain the moisture in the hoof.



The hot shoe must never be applied to the horse's foot under any circumstances.

When shoes are left on the feet for too great a length of time corns and other ailments result. Ordinarily a shoe should be removed once a month. The lightest shoe that will last for this time is the best shoe. It should carefully follow the form of the foot, or, if the foot is broken, the shoe follows the original shape of the foot. Its length is regulated by the bulb of the frog.

The ground surface of the shoe should be level and smooth, except for use in snow, when the shoe with the ground surface concaved prevents balling. That portion of the upper surface which presses against the bearing surface of the foot must be level, smooth, and accurately shaped to support it, and when the upper shoe surface is wider than the bearing surface the inner edge must be concaved to avoid excessive sole pressure. This is one of the most important requisites of correct horse-shoeing. Concussion of the sole against the inner edge of the upper shoe surface invariably produces soreness.

One side of the shank of a horse nail is flat. The other side is concave and also has a bevel near the point. This bevel as it enters into the horn forces the point of the nail in the direction of the other side (flat side). Therefore in driving a nail always hold it with the flat side toward outside edge of the shoe.

Nails should come out at a height of not more than 1 inch from the bottom of the hoof.

In garrison, at the discretion of the colonel or of the commanding officer, the horses may be left unshod, but shoes will be kept fitted for each horse ready to be put on.

956. The following examination should be made while the horse is standing on a level floor with the foot on the ground:

(*a*) Are the axes correct when viewed from the front and from the side?

(*b*) Does the shoe follow the outer line of the wall to the last nail hole and from there extend outward, allowing about one-eighth of an inch at the heel for expansion? Has the rule against rasping the hoof to fit the shoe been violated?

(*c*) Is the toe clip in the center properly made and properly seated?

(*d*) Are the nails driven at the proper height and proper distance apart? Have any old stubs been left in the wall?

(*e*) Are the clinches well turned and set in, of the proper size, and have they been smoothed off but not rasped sufficiently to weaken them?

The foot should then be raised and the examination continued.

(*f*) Is the shoe of the proper size and weight; the last nail hole back of the bend of the quarter?

(*g*) Has enough horn been removed; has too much been removed; is the foot level?

(*h*) Does the shoe rest evenly on the wall, covernig the buttress and showing no air space at any point?

(*i*) Is the shoe properly concaved so as to avoid pressure on the sole?

(*j*) Has the knife been used on the bars, sole, or frog?

(*k*) Are the nails well seated and of the proper size?

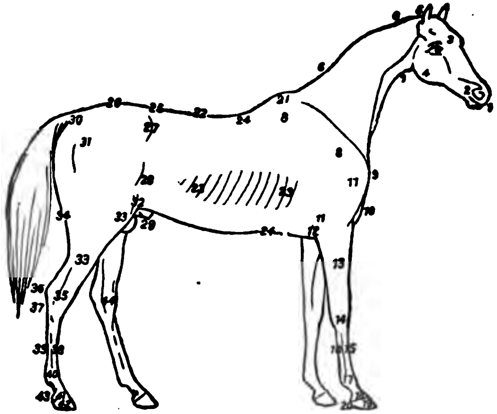
(*l*) Are the heels of the shoe correct in width and thickness, and are they properly rounded without sharp edges or points? Is their length even with the bulb of the frog?

In garrison a shoeing list should be kept on the stable bulletin board showing the name and hoof number of each horse, the date of last shoeing, and the class of shoes then used. The corresponding entries should be made daily, and at each "stables" the horses appearing on the list as shod since the last prior "stables" should be carefully inspected by the responsible officer. In general, horses should be shod every four or five weeks.

CHAPTER III.—TRAINING OF HORSES.

957.

POINTS OF THE HORSE.



Head.

1, Muzzle.
2, Nostril.
3, Forehead.
4, Jaw.
5, Poll.

Neck.

6, 6, Crest.
7, Throttle or windpipe.

Fore quarter.

8, 8, Shoulder blade.
9, Point of shoulder.
10, Bosom or breast.
11, 11, True arm.
12, Elbow.
13, Forearm (arm).
14, Knee.
15, Cannon bone.
16, Back sinew.
17, Fetlock or pastern joint.
18, Coronet.
19, Hoof or foot.
20, Heel.

Body or middle piece.

21, Withers.
22, Back.
23, 23, Ribs (forming together the barrel or chest).
24, 24, The circumference of the chest at this point, called the girth.
25, The loins.
26, The croup.
27, The hip.
28, The flank.
29, Sheath.
30, The root of the dock or tail.

Hind quarter.

31, The hip joint, round, or whirlbone.
32, The stifle joint.
33, 33, Lower thigh or gaskin.
34, The quarters.
35, The hock.
36, The point of the hock
37, The curb place.
38, The cannon bone.
39, The back sinew.
40, Pastern or fetlock joint.
41, Coronet.
42, Hoof or foot.
43, Heel.
44, Spavin place.

REMARKS ON HORSE TRAINING.

958. Mounted organizations can never expect to have, at any one time, a full complement of old, thoroughly trained horses. Horses are disposed of from time to time, and are replaced by new ones.

Other horses acquire bad habits or get out of hand, so that there is an ever-present necessity for the constant training of horses.

A large proportion of the work of signal troops is mounted. It is therefore essential that all signal officers be proficient horsemen and capable of directing the training of horses.

The horse is an animal of a single idea, and does not reason beyond the limits of his experience. He should be taught slowly, and with endless repetition of simple lessons.

He should be allowed to absorb the meaning of one move before crowding him with another. For instance, he should not be allowed to move off until after the rider is mounted, otherwise, he associates the weight of the rider with the move forward, and having once gotten that impression, it is difficult to separate the two ideas.

By sufficient repetition of the proper movements and careful avoidance of improper ones. a horse can be made to entirely forget bad habits. For instance, the dangerous habit of rearing can be entirely cured by careful avoidance for a time of the conditions that cause the horse to rear, thus permitting him to forget that he can do so.

The horse is capable of much hard work, and it is a mistake to suppose that he can be trained by means of short or infrequent lessons that give him no appreciable exertion.

TRAINING THE YOUNG HORSE.

959. When young horses are received, their training should take precedence over all other company work except the instruction of recruits.

Men to train the new horses should be selected from the best horsemen in the company, and should be relieved from all other duty during the horse-training period. They should be chosen for their love of horses, their patience and gentleness, as well as for skill in riding.

The young horse should always be ridden by the same rider, and each trainer may be required to train and care for three or more horses.

960. The **cavesson** is a light halter with the brow band, throatlatch, and cheek pieces like the bridle headstall, and has a noseband that may be adjusted with a buckle; there is also a running ring on the chin strap for the longe. The longeing strap is from 20 to 30 feet long. The lariat may be used.

The cavesson is put on after the snaffle has been fitted; the noseband should be placed about 3 inches above the nostrils, so as to not affect the breathing; it should act both as a noseband and curb, and be over the snaffle. It must not be buckled so tightly as to make the horse uneasy.

The first lesson to be taught a young horse is to go forward. Until he does this freely, nothing else should be required of him.

The practice of the longe is to supple and teach the horse the free and proper use of his legs. It thus aids in forming his gaits and in fitting him for the mounted service.

The lesson should be begun on a circle from 15 to 20 feet in diameter. As horses are usually fed, watered, saddled, and led from the left side, they are inclined to lead better from that than the right side. It will therefore generally be found necessary to give two lessons on the right to one on the left.

If a horse hesitates or stands still when he is ordered to move on, he should be encouraged, as such hesitation oftener comes from fear or ignorance as to what is required of him than from obstinacy or other vice.

The horse is first led several times around the circle at a walk. A man with a whip follows at a short distance and shows the whip occasionally when the horse hangs back; if this does not produce the desired effect, he should strike the ground in rear of the horse or touch him lightly with the whip until he obeys. When he moves freely at the walk, the man holding the longe should gently urge him to trot, and gradually lengthen the rein so that the horse may scarcely notice it; he should continue to go round the circle at an active pace, nearly opposite the horse's shoulder, so as to keep him out and urge him forward.

If the horse takes kindly to this lesson, the man holding the longe may lengthen it by degrees until he has only to turn in the same spot, the man with the whip being careful to keep the horse out of the line of the circle.

When the horse breaks his pace or plunges, the rein should be shaken horizontally without jerking until he returns to the trot.

The man holding the longeing rein should have a light and easy hand. For the first two or three days the horse must not be urged too much; if he goes gently, without jumping or resisting, enough is accomplished. He should be longed to the right, left, and right again, changing from the trot to the walk and back again in each case. He should be frequently halted by gently feeling the rein and speaking to him; and at the conclusion of each lesson the rein should be carefully shortened and gathered up in the hand, and the horse brought to the center of the circle and caressed before being dismissed.

After a few days of the above practice, the horse may be urged a little more in the trot, but great care is requisite to teach him to use his limbs without straining them. Much harm may be done in this instruction by a sudden jerk or a too forcible pull on the longe.

Care must be taken that the lessons are not made so long as to fatigue or fret the horse, being gradually increased in length as the instruction progresses. The man holding the longeing rein should take it short in one hand, at the same time patting and rubbing the horse about the head and neck with the other; he should then try to bend the horse's neck a little to the right and to the left by means of the longeing rein; the bend should be in the very poll of the neck, and should be cautiously repeated at the end of each lesson until the horse responds easily; this will greatly facilitate the future instruction. The longe is used to instruct the new horses, especially if timid, to jump the bar and ditch.

961. When the horse is quieted by work and gentle on the longe advantage should be taken of that condition to teach him gradually to bear the saddle—a lesson which, if given in the stable, might prove difficult. The saddle is first put on without stirrups or stirrup straps; the girth, quite loose at first, is tightened gradually during the work. When the horse is accustomed to the contact of the saddle and girth the stirrups are added and allowed to hang down on each side at the walk and trot. He is thus prepared for the mounting lesson, which becomes easy; saddling and mounting a young horse for the first time on the same day generally arouses his resistance.

962. The instructor selects, according to circumstances, the most opportune moment for giving the mounting lesson, always taking advantage of the calmness due to fatigue at the end of the period of instruction.

This lesson may also be given during the work on the longe, but always after the horse has been quieted by exercise. The instructor personally directs the first lesson, which is given to each horse individually. The greatest gentleness and patience are here necessary.

Accompanied by an assistant carrying a small measure of oats, if need be, he places himself squarely in front of the horse and pats him, taking hold of him only in case of necessity; the rider approaches the horse's head, pats him on the forehead, over the eyes, on the neck, and haunches. He strikes the saddle, lowers and raises the stirrups, then takes the reins, leaving them very long. He mounts without hurry, but without hesitation. If, during the lesson, the horse moves out of place or backs away, he goes back to the head, draws the horse forward with the snaffle reins and quietly begins again.

The rider in putting his foot in the stirrup is careful to point his toe down and not to touch the horse's side; this might disturb him. He should not stop after raising himself in the stirrup; that would break the equilibrium and run counter to the end sought. He should use his right hand in taking the right stirrup; in feeling for it with the toe he may frighten the horse.

In general he should avoid putting the horse in march as soon as he is in the saddle, so that the idea of the forward movement will not be associated in the horse's brain with receiving the rider's weight.

It is best the first few times to end the day's work with the mounting lesson and send the horse to the stable as a reward.

If a horse is found very difficult, the instructor immediately puts him back on the longe.

The mounting lesson should be given on both the right and left sides. This instruction of the colt should be thorough.

Absolute docility must be obtained, even in the midst of noise and movement. However, it is well not to require too much at the very beginning.

963. The **running rein** is of great value in teaching a horse to keep his head in a proper position, and affords valuable aid in his first handling. If judiciously used, it saves the rider a great deal of trouble and the horse much ill-usage, and simplifies the subject of "bits and bitting." It is especially useful in controlling horses that are inclined to bolt.

It should act directly on the snaffle bit itself, and is wholly independent of the reins.

The running rein consists of three parts—the chin strap, rein, and martingale.

The **chin strap**, about 6 to 8 inches long, on which is suspended a loose ring, is fastened to both snaffle-bit rings.

The **martingale** has only one ring; the loop through which the girth passes is made adjustable by a buckle. The martingale is so adjusted that when taut the ring will be on a level with the points of the horse's shoulders .

The **rein** is about 8½ feet long; one end is buckled into the near pommel ring; the free end is then passed through the martingale ring from rear to front, thence through the chin-strap ring from left to right, thence through the martingale ring from front to rear and is held in the rider's right hand.

A pull on this rein will act directly on the mouthpiece, drawing it back and somewhat downward toward the horse's breastbone.

964. Before commencing the **bending lessons**, it is well to give the horse a preparatory one in obedience to make him sensible of the power man has over him. This first act of submission will prove of great service, and gives the man such ascendancy as to prevent the horse at the outset from resisting the means employed to bring him under control.

Go up to the horse, pat him on the neck, and speak to him; then take the reins off the horse's neck and hold them at a few inches from the rings of the bit with the left hand; take such position as to offer as much resistance as possible to the horse, should he attempt to break away; hold the whip in the right hand, with the point down; raise the whip quietly and tap the horse on the breast; the horse naturally tries to move back to avoid the whip; follow the horse, at the same time pulling against him, and continuing the use of the whip; be careful to show no sign of anger nor of yielding. The horse, tired of trying ineffectually to avoid the whip, soon ceases to pull, and moves forward; then drop the point of the whip and make much of him. This repeated once or twice usually proves sufficient. The horse, having found how to avoid the punishment, no longer waits for the application of the whip, but anticipates it by moving up at a gesture.

Bending lessons should be given each day, so long as the snaffle bit is used alone; but the exercise should be varied, so that the horse may not become fatigued or disgusted.

The horse's balance and his lightness in hand depend on the proper carriage of his head and neck.

A young horse usually tries to resist the bit, either by bending his neck to one side, by setting his jaw against the bit, or by carrying his nose too high or too low.

The bending lessons serve to make the horse conform to the movements of the reins and yield to the pressure of the bit. During the lessons the horse must never be hurried.

965. To bend to the right.—Take a position on the left side of the horse in front of his shoulder and facing toward his neck; take the right rein close against the bit in the right hand, the near rein in the same way in the left hand, the thumbs toward each other, the little fingers outward; bring the right hand toward the body, and at the same time extend the left arm so as to turn the horse's head to the right.

The force employed must be gradual and proportioned to the resistance met with, and care must be taken not to bring the horse's nose too close to his chest. If the horse moves backward, continue the pressure until, finding it impossible to avoid the restraint imposed by the bit, he stands still and yields to it.

When the bend is complete, the horse holds his head without any restraint and champs the bit; then make much of him and let him resume his natural position by degrees, without throwing his head around hurriedly.

A horse, as a rule, champs the bit when he ceases to resist.

The horse's neck is bent to the left in a similar manner, the man standing on the right side.

966. To arch the neck.—Being on the left side of the horse: Cross the reins behind the horse's jaw, taking the left rein in the right hand, the right rein in the left, at about 6 inches from the rings, and draw them across each other till the horse gives way to the pressure and brings his nose in. Prevent the horse from raising his head by lowering the hands. When the horse gives way to the cross pressure of the reins, ease the hand and make much of him.

967. To lower the head.—Being mounted: Take the right rein in the right hand, the left rein in the left, and feel lightly the mouth of the horse; then, holding the hands low, play with the bit, gently drawing in the reins as the horse drops his nose. When the horse, opening his mouth, yields the lower jaw to the bit and brings in his head so that the face is vertical, release the tension of the reins and caress the horse for his obedience. By degrees the horse can be taught to depress the head to any extent.

968. To elevate the head.—Being mounted: Hold the reins separately, as prescribed above, and with arms extended forward, make light pulls upward upon the reins; when the horse has obeyed, lower the hands so that the horse can lower his muzzle, and then quietly demand that the face of the animal shall be brought into the vertical position.

969. To carry the head to the right.—Being mounted: Hold the reins as previously prescribed, and drawing the right rein toward the body, carry the head of the horse a little to the right, using the left hand to measure the effect of the right, to keep the face of the horse vertical, and to aid in keeping the jaw pliant. The rider should be satisfied with slow progress, but in time the head should be brought round so that the face, with the nose down, shall look to the rear. By this exercise the head and neck are suppled and made submissive. After the head has been carried to the right, the left hand, supported by the right, will carry the head to the front, and the vertical position of the head be demanded by a play of both reins. In a similar manner the head will be carried to the left.

970. After the horse has submitted quietly to this instruction he will be required to move forward.

For this purpose the rider takes the snaffle rein in each hand and feels lightly the horse's mouth; the man with the longe leads the horse forward and longes him first to the left and then to the right, at a walk; if the horse shows any disposition to kick or plunge, the longe is shaken lightly to engage his attention.

After a short lesson the rider dismounts, the horse is petted and dismissed.

These lessons are continued until the horse can be made to go forward, to the right and left, to halt, and rein back by application of the aids.

BREAKING THE HORSE TO HARNESS.

971. The harness should be put on the horse in the stable with caution, and at first without traces, so that in the event of the horse jumping about they will not hang around his legs and frighten him. The horse should then be fed in his harness, and after standing for some hours, be walked about in it.

When the horse has thus been fed and walked about and has become reconciled to the harness, the traces should be attached and a rope tied to the rear end of each; a man then takes the ends of the ropes and the horse is walked about, the man holding the ropes taking care that the traces do not rub against the sides of the horse in the beginning, but accustom him to them gradually.

When the horse has become accustomed to the pressure of the collar and traces he may be then hitched in with a steady horse. At first the utmost caution should be observed, and a foreleg held up, if necessary, while the traces are being fastened, and no noise or shouting should be permitted. After being hitched in, the horse should be permitted to stand still for some minutes before the carriage is started, and it should be put in motion by the other horses. The horse should be left to himself and not be required to draw at first; all that should be demanded of him is to move forward quietly.

TO BREAK THE HORSE OF KICKING.

972. The horse is thrown and one end of each of two long straps is made fast to the bit rings; the other ends are passed through rings on the leather surcingle and secured to the hind pasterns. When thus secured, all means should be resorted to in order to make the horse kick, and this should be repeated until he no longer struggles nor attempts to move his hind legs under any provocation whatever.

SWIMMING AND FORDING.

973. As it is often necessary for mounted troops to cross streams by swimming, the exercise is important, as it gives confidence to men and animals.

The horses are at first equipped with the watering bridle and are barebacked. The reins are on the horse's neck just in front of the withers and knotted so that they will not hang low enough to entangle the horse's feet, care being taken to have them so placed as to permit the horse to push his nose well out and to have entire freedom of the head. The horse should be watered, but not too freely, before entering him into the stream. The man mounts, rides into the stream, and when he gets into deep water, drops reins, seizes a lock of the mane with the upstream hand, allows his body to drift off quietly to the downstream side of the horse, and floats or swims flat on the water, guiding the horse, when necessary, by splashing water against his head, only using the reins when the splashing fails. When the horse touches bottom at the landing, the man pulls himself on the horse's back and takes the reins. The horse is easily controlled when swimming; he is also easily confused. It is therefore necessary that the man should be gentle and deliberate. The man must be cautioned that pulling on the reins is apt to pull the horse over backward, and that when the horse touches bottom he may begin to plunge.

The man will also be required to swim holding the horse's tail, the horse towing him.

After the man and horse have gained confidence, the man will be required to be seated on his horse, with or without saddle, while swimming. The man's weight presses the horse down and impedes his movements, and when saddled the man should hold the knees well up to lessen the resistance, and steady his seat by holding on the mane or the pommel of the saddle.

With some horses, especially those that swim low, it is advisable that the man sit behind the saddle to allow the forequarters to float high.

The men will also be practiced in swimming the horses when fully armed and equipped. The stirrups are crossed and secured. The horse is guided by the reins. The men are instructed in crossing swift-running water to keep their eyes fixed on the opposite bank.

When large, swift rivers are to be crossed, too hazardous for all the horses to be ridden, the bridle reins are secured to avoid the danger of their being caught by the horse's feet, or by those of another horse swimming close to him; the stirrups are crossed and secured; a trained horse is selected for a leader and is ridden without saddle; all the horses are led or driven to the approach and can generally be made to take the water without much difficulty. The approach should be selected at some distance above the landing. If practicable, a few horses should be taken over and placed at the landing, and some men stationed to receive the horses as they land.

If there be a pontoon bridge in the immediate vicinity, the crossing should be below it.

When a horse is towed or led from a boat, he should be held astern of the oars and on the downstream side or in the wake.

When a stream with a treacherous bottom is to be forded, stakes or bushes should be placed so as to mark the limits of the ford, or may be placed so as to mark the dangerous places only.

When the stream is to be forded at night, lighted lanterns should be fastened to the stakes and one displayed at the landing or a fire built there.

When the stream has a swift current and the water is above the horses' bellies, the subdivisions should cross with as wide a front as practicable, to permit a freer flow or prevent damming the water, which might carry a horse off his feet; but in crossing a dangerous ford, the column of twos is less objectionable than the column of fours.

Mounted troops should generally cross streams above infantry or so far below that the water will not be dammed against them.

TO ACCUSTOM THE HORSE TO THE REPORT OF FIREARMS.

974. This part of the horse's education should not be commenced until he has become so familiar with the aids that he makes no resistance when they are applied. He is then shown the pistol, allowed to smell it, made familiar with the sound of the cocking and the falling of the hammer, the man at the same time talking to and caressing him to allay his fears. A blank cartridge is fired some distance from him. The horse will be startled, but his fears will be dispelled by kind words and caresses. The horse's fears having been quieted, other shots will be fired nearer and nearer to him, observing the same caution.

Great care should be exercised that the pistol be not discharged too near the horse's ears nor so close to him that the powder will burn him; a horse once injured in this way will nearly always be nervous while firing is going on.

This lesson is repeated several times, until the horse no longer flinches materially nor struggles after a shot is fired.

Horses that shy may be treated in this way: Tie a rope with a slipknot around the body over the loins, the knot under the belly; the free end of the rope is passed under the horse between his forelegs and carried up through the halter ring and made fast to a suspended rope, sustained in place by guy ropes to prevent too much lateral motion.

The horse being thus secured, such articles as robes, blankets, etc., of which he may have shown fear, are brought into his sight, and he is encouraged to smell or touch them. Pistol firing is practiced until he ceases to show signs of alarm.

The object in having a rope suspended is to prevent the horse from hurting himself and yet allow him freedom to move his haunches. The picket rope, if high enough, will do.

1071. Roads with ascents and descents, stretches of sand and with stream crossings impose corresponding changes of gait or pace on each of the small elements of a command as it reaches them. To provide for this condition, troops in route column may be directed to take greater distances than those prescribed to allow for closing up at checks.

It is an excellent plan to occasionally dismount and lead the animals. This should be the rule in descending long grades.

1072. The habitual formation for marches is **route order.**

Companies in battalion should lead on alternate days, except that in case foot and mounted troops are required to march together, the foot troops should always lead.

Mounted troops should be promptly dismounted when they are not to move on at once. They should never be kept mounted while standing at the halt.

1073. On the march, animals should be watered frequently, conforming as far as practicable, to the rule of watering before feeding. Bits should always be removed. An officer should always be in charge of the watering.

1074. Platoon chiefs and section chiefs, without waiting for further directions will give such orders as are necessary for helping horses or vehicles out of difficulty.

Sections may be dismounted and used for this purpose if needed.

1075. When an accident happens to a vehicle it will be pulled out of column, if possible, so as not to interrupt the march; otherwise sections in rear pass it by on the most convenient flank. As soon as the damage is repaired, it will resume its proper place in the most expeditious manner. If a vehicle or animal has to leave the column for any purpose, the section chief will cause a noncommissioned officer and the necessary number of men to remain with it until the damage is repaired or found to be beyond repair.

1076. Each march should be preceded by a conference of officers in each battalion and of noncommissioned officers in each company, at which the commanding officer will explain its principal features upon the map, the nature of the general operations, and the specific problem of the signal troops in detail.

CHAPTER III.—CAMPS.

1077. There are two general classes of camps; semipermanent camps and temporary camps.

1078. Semipermanent camps are used for troops in mobilization, concentration, or maneuver camps, and during such pauses in operations as permit the better care of troops.

1079. Temporary camps are used on the march or during operations when halts are made only for the night or for a few days at most.

SECTION I.—SEMIPERMANENT CAMPS.

GENERAL.

1080. Semipermanent camps contemplate the use of pyramidal and wall tents, mess shelters, baths, latrines, raised picket lines on substantial posts, and corrals when practicable. The equipment therefor is classed as Equipment "B," and is not carried on division trains, but when required is brought up by other transportation.

1081. The forms and dimensions of semipermanent camps and the character and amount of tentage or other shelter used vary greatly with the conditions.

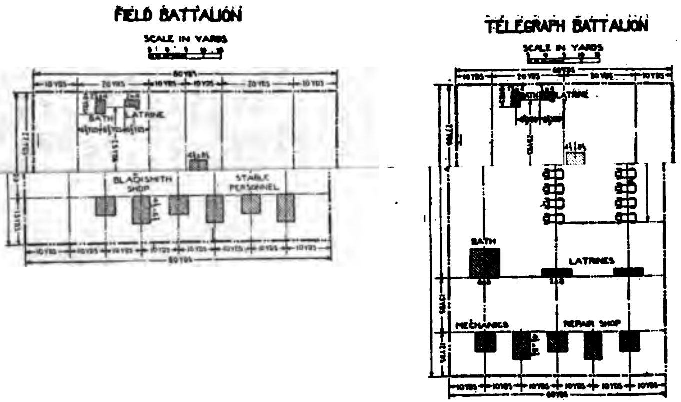
Every effort must be made to provide adequate shelter for both men and animals.

Animals constantly exposed to the sun in hot weather and to cold winds, rain, or snow in winter lose condition very rapidly.

1082. Suitable tents or other shelter must be provided for workshops for mechanics and for kitchens. Condemned canvas can be utilized for these purposes in camps of a duration too short to justify suitable buildings.

When the camp is reached by rail the timbers used in securing the carriages on the cars are, if carefully removed, very convenient for such purposes.

1083. The detailed arrangements of the normal semipermanent camps are given in plate 11. Whenever practicable the width of the camps therein shown should be somewhat extended.


FIELD BATTALION

TELEGRAPH BATTALION

PLATE 11.—SEMI-PERMANENT CAMPS.

102290°—17. (To face page 418.)

The picket line should be well drained by cutting ditches about 12 feet on either side of the line and throwing the earth to the center. Whenever practicable the ground should be covered with broken stone, sand, or cinders. Particular care must be taken to provide dry footing not only on the picket line but around the watering places in semipermanent camps.

The requirements which semipermanent camp sites should fulfill are given in Field Service Regulations.

1084. In semipermanent camps guard and other duties follow closely the custom in garrison.

The camp is policed daily after breakfast and all refuse burned. Tent walls are raised immediately after breakfast and the bedding and clothing aired daily, weather permitting.

TO PITCH HEAVY TENTAGE.

1085. To pitch all types of army tents, except shelter tents: Mark each line of tents by driving a wall pin at the spot to be occupied by the right (left) corner of each tent. For pyramidal tents the interval between adjacent pins should be about 30 feet, which will give a passage of 2 feet between tents. If the tripod is used, spread it on the ground where the center of the tent is to be. Spread the tent on the ground to be occupied, door to the front, and place the right (left) front wall loop over the pin. The door (or doors, if more than one) being fastened and held together at the bottom, the left (right) corner wall loop is carried to the left (right) as far as it will go and a wall pin driven through it, the pin being placed in the line with the right (left) corner pins already driven. At the same time the rear corner wall loops are pulled to the rear and outward so that the rear and side walls of the tent are stretched. Wall pins are then driven through these loops directly in rear of the corresponding front corner pins, making a rectangle. Unless the canvas be wet, a small amount of slack should be allowed before the corner pins are driven. According to the size of the tent, one or two men, crawling under the tent if necessary, fit each pole or ridge or upright into the ring or ridgepole holes, and such accessories as hood, fly, and brace ropes are adjusted. If a tripod be used, an additional man will go under the tent to adjust it. The tent, steadied by the remaining men, one at each corner guy rope, will then be raised. If the tent is of the ward or storage type, corner poles will now be placed at the four corners. The four corner guy ropes are then placed over the lower notches of the large pins driven in prolongation of the diagonals at such distance as to hold the walls and ends of the tent vertical and smooth when the guy ropes are drawn taut. A wall pin is then driven through each remaining wall loop and a large pin for each guy rope is driven in line with the corner guy pins already driven. The guy ropes of the tent are placed over the upper notches, while the guy ropes of the fly are placed over the upper notches and are then drawn taut. Brace ropes, when used, are then secured to stakes or pins suitably placed.

TO STRIKE HEAVY TENTAGE.

Strike tents.

1086. The men first remove all pins except those of the four corner guy ropes. The pins are neatly piled or placed in their receptacle.

One man holds each guy, and when the ground is clear the tent is lowered and folded, or rolled and tied, the poles or tripod and poles fastened together, and the remaining pins collected.

TO FOLD TENTS.

Common, wall, hospital, and storage tents.

1087. Spread the tent flat on the ground, folded at the ridge so that bottoms of side walls are even, ends of tent forming triangles to the right and left; fold the triangular ends of the tent in toward the middle, making it rectangular in shape; fold the top over about 9 inches; fold the tent in two by carrying the top fold over clear to the foot; fold again in two from the top to the foot; throw all guys on tent except the second from each end; fold the ends in so as to cover about two-thirds of the sec ond widths of canvas; fold the left end over to meet the turned-in edge of the right end, then fold the right end over the top, completing the bundle; tie with the two exposed guys.

Pyramidal tent.

1088. The tent is thrown toward the rear and the back wall and roof canvas pulled out smooth. This may be most easily accomplished by leaving the rear-corner wall pins in the ground with the wall loops attached, one man at each rear-corner guy, and one holding the square iron in a perpendicular position and pulling the canvas to its limit away from the former front of the tent. This leaves the three remaining sides of the tent on top of the rear side, with the door side in the middle.

Now carry the right-front corner over and lay it on the left-rear corner. Pull all canvas smooth, throw guys toward square iron, and pull bottom edges even. Then take the right-front corner and return to the right, covering the right-rear corner. This folds the right side of the tent on itself, with the crease in the middle and under the front side of the tent.

Next carry the left-front corner to the right and back as described above; this when completed will leave the front and rear sides of the tent lying smooth and flat and the two side walls folded inward, each on itself.

Place the hood in the square iron which has been forced downward toward the bottom of the tent, and continue to fold around the square iron as a core, pressing all folds down flat and smooth and parallel with the bottom of the tent. If each fold is compactly made and the canvas kept smooth the last fold will exactly cover the lower edge of the canvas. Lay all exposed guys along the folded canvas, except the two on the center width, which should be pulled out and away from bottom edge to their extreme length for tying. Now, beginning at one end, fold toward the center on the first seam (that joining the first and second widths) and fold again toward the center, so that the already folded canvas will come to within about 3 inches of the middle width. Then fold over to the opposite edge of middle width of canvas. Then begin folding from opposite end, folding the first width in half; then, making a second fold to come within about 4 or 5 inches of that already folded, turn this fold entirely over that already folded. Take the exposed guys and draw them taut across each other, turn bundle over on the under guy, cross guys on top of bundle, drawing tight. Turn bundle over on the crossed guys and tie lengthwise.

When properly tied and pressed together this will make a package 11 by 23 by 34 inches, requiring about 8,853 cubic inches to store or pack.

SECTION II.—SHELTER TENT CAMPS.

GENERAL.

1089. The shelter tent or temporary camp is used in the field when halts are not to be of sufficient duration to justify the bringing up of semipermanent camp equipage, or when same is not available. They will, of necessity, vary greatly in form, dimensions and area occupied and in the means available for the improvisation of camping expedients. The regulations and plates hereinafter prescribed are given as conforming to usual conditions and should govern in all instruction in the selection and occupation of shelter-tent camp sites. In actual service the dispositions in camp must be adapted to the ground and must be made so as to derive the maximum benefit from the meager camp equipment carried. The camp will in this latter instance, therefore, seldom be ideally regular. Whenever possible, battalions, companies, and platoons should be camped in column of sections (in outpost companies, column of platoons). The principal advantage accruing in camping in columns is the freedom afforded for withdrawing independent sections from camps when it is desired to send them on detached missions.

1090. Even in small commands, the commanding officer, or an officer designated, should precede the column to look over the camping ground and decide on the arrangement of the camp, so that on the arrival the command may immediately occupy the ground assigned it and commanders may be promptly informed as to arrangement for water, fuel, forage, and rations.

THE SELECTION OF SHELTER TENT CAMP SITES.

1091. In campaign, tactical necessity may leave little choice in the selection of camp sites, but under any conditions the requirements of sanitation should be given every consideration consistent therewith.

1092. In general, the following principles govern:

The site should be convenient to an abundant supply of pure water.

Good roads should lead to the camp. Interior communication throughout the camp should be easy. A camp near a main road is undesirable on account of dust and noise.

Wood, grass, forage, and supplies should be at hand or easily obtainable.

The ground should accommodate the command without crowding and without compelling the troops of one unit to pass through the camp of another.

The site should be sufficiently high and rolling to drain off storm water readily, and, if the season be hot, to face the breeze. In cold weather it should preferably have a southern exposure, with woods to break the prevailing winds. In warm weather an eastern exposure, with the site moderately shaded by trees, is desirable.

The site should be dry. For this reason porous soil, covered with stout turf and underlaid by a sandy or gravelly subsoil, is best. A site on clay soil, or where the ground water approaches the surface, is damp and unhealthful.

Alluvial soils, marshy ground, and ground near the base of hills or near thick woods or dense vegetation are undesirable as camp sites on account of dampness. Ravines and depressions are likely to be unduly warm and to have insufficient or undesirable air currents.

Proximity to marshes or stagnant water is undesirable on account of the dampness and mosquitoes and the diseases which the latter transmit. The high banks of lakes or large streams often make desirable camp sites.

Dry beds of streams should be avoided; they are subject to sudden freshet.

1093. The occupation of old camp sites is dangerous, since these are often permeated by elements of disease which persist for considerable periods. Camp sites must be changed promptly when there is evidence of soil pollution or when epidemic disease threatens, but the need for frequent changes on this account may be a reflection on the sanitary administration of the camp.

A change of camp site is often desirable in order to secure a change of surroundings and to abandon areas which have become dusty and cut up.

THE FIELD BATTALION CAMP.

1094. The field battalion, or any fraction thereof, will normally camp in accordance with the provisions of plate 12.

Occupation of Camp Site.

1095. The command is normally conducted from left to right along the rear of the plot selected for the camp site. The location of the camp site of the leading section of the leading company is indicated to the captain of that company and the command 1. **By company**, 2. **At camping interval**, 3. **LEFT INTO LINE** is given. The captain of each company commands: 1. **At —— yards interval**, 2. **Left into line**, adding 3. **MARCH**, at a time so that the leading section of the company in executing the movement ordered will find itself marching to the left over the ground to be occupied by the section picket line and with the center of the section in prolongation of the line of the front of the section line of shelter tents to be established. In giving the preparatory commands for forming left into line, each captain announces such interval as will give an interval of 8 yards between section picket lines when they are secured in prolongation of the center line of the sections, and gives the command of execution so that his right section picket line will be 16 yards from the left picket line of the company on the right. For the company on the left of the outpost company this distance will be increased to 24 yards.

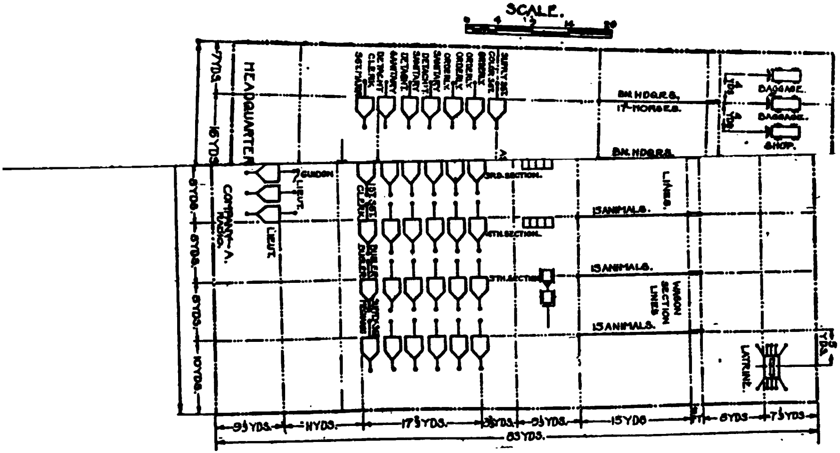


Plate 12.—SHELTER TENT CAMP OF A FIELD BATTALION.

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Each captain halts his company when the rear of the leading section has reached a point 4 yards in advance of where the front pin of the section picket line is to be placed. The remaining sections halt with the rear elements aligned on that of the right section.

When the command is halted and rear elements aligned, the command **MAKE CAMP** is given. Each captain commands **SECURE PICKET LINES.** At this command, each chief of section takes charge of his section, causes the men to dismount and turn animals over to horseholders. The section picket line is then secured, the front picket pin being placed 4 yards directly in rear of the center of the section and the rear pin 50 feet therefrom and in such a position that the picket line, when tightened, will be in continuation of the line formed by the front of the section line of shelter tents to be established and the tongue of the wire cart or the front edge of the aparejo park.

The wagon radio section and the platoons of the outpost company camp in two lines as indicated. The battalion and company lines are secured simultaneously and in a like manner by the appropriate personnel.

1096. After section lines and the company line have been secured as above each captain commands: **TIE TO THE LINE.** Wire carts are unhitched and harness removed and disposed as before prescribed, bridles are removed from pack and riding animals, and all animals are tied to the line. Girths are loosened on pack and riding animals, saddles being left on until the backs are cooled. One or two men are left at each picket line at this time to watch animals and prevent them from lying down or rolling. Where no company lines are provided, company headquarters combat animals are distributed among section lines to the best advantage. Field-train animals except those drawing ration vehicles are tied to their wagons. Each section, less temporary picket-line guard, is formed in two ranks dismounted, as prescribed in paragraph **93**, facing to the right or left, as indicated, with the chief of section (in platoons of the outpost company, the assistant platoon chief) on the right (left) of the front rank directly in front of the section picket line and about 13 yards from the front picket pin. Assistant platoon chiefs in the outpost company and the chief of the wagon radio section take post on the right (left) of the front line of their sections. Men carry their blanket roll, saddlebags, canteens, and haversacks.

The chief of each section then causes his section to take interval to the left (right) as prescribed in paragraph **100** and commands: **PITCH TENTS.** As each man faces to the front he places his blanket roll and other equipment on the ground. Members of the company and battalion staff not grouped into a provisional section pitch tents, and wagon transportation is disposed as indicated in the plate. Drivers of instrument, shop, and field train wagons sleep in or under them.

After tents are pitched sections return to picket lines, unsaddle the animals, take individual saddle equipment to the tents, and arrange the aparejos and other equipment in park.

Wood, water, and the necessary guard and fatigue details assume their duties.

THE TELEGRAPH BATTALION CAMP.

1097. The telegraph battalion, or any fraction thereof, will normally camp in accordance with the provisions of plate 13.

Occupation of camp site.

1098. The telegraph battalion will conform as nearly as practicable to the means and methods prescribed for the field battalion in the occupation of camp sites.

TO PITCH SHELTER TENTS.

1099. At the command **PITCH TENTS** the men open their blanket rolls and take out the shelter half, poles and pins; the front man places one pin in the ground at the point where his right heel, kept in position until this time, was planted. Each then spreads his shelter half, triangle to the rear, flat upon the ground the tent is to occupy, rear man's half on the right. The halves are then buttoned together. Each front man joins his pole, inserts the top in the eyes of the halves, and holds the pole

SCALE

upright beside the pin placed in the ground; his rear rank man, using the pin in front, pins down the front corners of the tent on the line of pins, stretching the canvas taut; he then inserts a pin in the eye of the rope and drives the pin at such distance in front of the pole as to hold the rope taut. Both then go to the rear of the tent; the rear rank man adjusts the pole and the front rank man drives the pins. The rest of the pins are then driven by both men, the rear rank man working on the right.

The guy ropes, to have a uniform slope when the shelter tents are pitched, should all be of the same length.

TO STRIKE SHELTER TENTS.

1100. The men standing in front of their tents: **Strike tents.** Equipments are removed from the tents; the tents are lowered, rolls made up, equipments slung, and the men stand at attention in the places originally occupied after taking intervals.

DOUBLE SHELTER TENTS.

1101. The double shelter tent is formed by buttoning together the square ends of two single tents. Two complete tents, except one pole, are used. Two guy ropes are used at each end, the guy pins being placed in front of the corner pins.

The double shelter tents are pitched by Nos. 1 and 2 front and rear rank, and by Nos 3 and 4, front and rear rank; the men falling in on the left are numbered, counting off if necessary.

The same commands are given as before for taking intervals, and the command **PITCH DOUBLE TENTS** is given.

Only the odd numbers of the front rank mark the line with the tent pin.

All the men spread their shelter halves on the ground the tent is to occupy. Those of the front rank are placed with the triangular ends to the front. All four halves are then buttoned together, first the ridges and then the square ends. The front corners of the tent are pinned by the front-rank men, the odd number holding the poles, the even number driving the pins. The rear-rank men similarly pin the rear corners.

While the odd numbers steady the poles, each even number of the front rank takes his pole and enters the tent where, assisted by the even number of the rear rank, he adjusts the pole to the center eyes of the shelter halves in the following order: First, the lower half of the front tent; second, the lower half of the rear tent; third, the upper half of the front tent; fourth, the upper half of the rear tent. The guy ropes are then adjusted.

WATER SUPPLY.

1102. Immediately on making camp a guard should be placed over the water supply. If the water be obtained from a stream, places should be designated, beginning upstream, (1) for drinking and cooking, (2) for watering animals, (3) for bathing and washing clothing.

If the stream be small, the water supply may be increased by building a dam. Small springs may be dug out and each lined with a gabion, or a barrel or box with both ends removed, or with stones, the space between the lining and the earth being filled with puddled clay. A rim of clay should be built to keep out surface drainage. The same method may be used near swamps, streams, or lakes to increase or clarify the water supply.

1103. Water that is not known to be pure should be boiled 20 minutes; it should then be cooled and aerated by being poured repeatedly from one clean container to another, or it may be purified by approved apparatus supplied for the purpose.

1104. Arrangements should be made for men to draw water from the authorized receptacles by means of a faucet. The dipping of water from the receptacles or the use of a common drinking cup should be prohibited.

1105. On the march, including camps, the daily requirements of water may be estimated at 6 gallons per man or 10 gallons per horse. In permanent or semipermanent camps the supply should be sufficient to provide from 25 to 30 gallons per man and 15 gallons per horse per day. This supply should be properly piped and delivered at convenient places in each organization camp.

KITCHEN.

1106. Camp kettles are hung on irons or on a support consisting of a green pole lying in the crotches of two upright posts of the same character.

A narrow trench for the fire, about 1 foot deep under the pole, protects the fire from the wind and saves fuel. A still greater economy of fuel can be effected by digging a similar trench in the direction of the wind and slightly narrower than the diameter of the kettles. The kettles are then placed on the trench and the space over it and between the kettles filled in with stones, clay, or mud, leaving the flue running beneath the kettles. The draft can be improved by building a chimney of similar material at the leeward end of the flue.

Four such trenches radiating from a common central chimney will give one flue for use whatever may be the direction of the wind.

A slight slope in the flue, from the chimney down, provides for drainage and improves the draft.

1107. The lack of portable ovens can be met by ovens constructed of stone and covered with earth to retain the heat. If no stone is available, an empty barrel, with one head out, is laid on its side and covered with wet clay to a depth of 6 or more inches, and then with a layer of dry earth equally thick. A flue is constructed with clay above the closed end of the barrel, which is then burned out with a hot fire. This leaves a baked clay covering for the oven.

A recess can be similarly constructed with boards, or even brushwood, supported on a horizontal pole resting on upright posts, covered and burnt out as in the case of the barrel.

When clay banks are available, an oven may be excavated therein and used at once.

To bake in such ovens, first heat them and then close flues and ends.

1108. Food must be protected from flies, dust, and sun. Facilities must be provided for cleaning and scalding the mess equipment of the men. Kitchens and the ground around them must be kept scrupulously clean.

1109. Solid refuse should be promptly burned, either in the kitchen fire or in an improvised crematory.

1110. In temporary camps, if the soil is porous, liquid refuse from the kitchens may be strained through sacking into seepage pits dug near the kitchen. Boards or poles, covered with brush or grass and a layer of earth may be used to prevent the access of flies. The strainer should also be protected from flies. Pits of this kind in clay soil will not operate successfully. All pits should be filled with earth when the camp is abandoned.

DISPOSAL OF EXCRETA.

1111. Immediately on arriving in camp sinks should be dug. This is a matter of fundamental sanitary importance, since the most serious epidemics of camp diseases are spread from human excreta.

One sink is usually provided for each company and one for the officers of each battalion. Those for the men are invariably located on the side of camp opposite the kitchens. All sinks should be so placed that they can not pollute the water supply or camp site as a result of drainage or overflow. To insure this, their localities and their distance from camp may be varied.

1112. When camp is made for a single night, shallow trenches, 12 inches deep and 15 to 18 inches wide, which the men may straddle, will suffice.

In camps of longer duration, and when it is not possible to provide latrine boxes, as for permanent camps, deeper trenches should be dug. These may be used as straddle trenches or a seat and back rest improvised from poles or other available material. They should be screened by brush, condemned canvas, or other material. When open trenches are used, special care must be taken to insure that all excreta is covered with earth, lime, or ashes as soon as it is deposited.

1113. In permanent or semipermanent camps special sanitary facilities for the disposal or disinfection of excreta will ordinarily be provided. When trenches are used in such camps they should be at least 6 feet deep and 12 feet long and not more than 2 feet wide. Seats are walled to the ground and provided with lids to keep flies from reaching the deposits; urinal troughs discharging into the trenches are provided. Each day the latrine boxes are thoroughly cleaned, outside by scrubbing and inside by applying when necessary a coat of crude oil or whitewash. The pit is burned out daily with approximately 1 gallon of crude oil and 15 pounds straw. When filled to within 2 feet of the surface, such latrines are discarded, filled with earth, and their position marked.

In permanent camps urine tubs should be placed in the company streets at nightfall; they are emptied after reveille. Their location should be plainly marked and thoroughly and frequently disinfected.

CARE OF TROOPS AND ANIMALS.

1114. Lack of sufficient rest renders troops unfit for hard work and diminishes their power of resisting disease. Therefore commanders should secure for the troops, whenever possible, their accustomed rest.

1115. The rules of sanitation must be enforced.

1116. Men should not be on damp ground. In temporary camps and in bivouac they raise their beds if suitable material such as straw, leaves, or boughs can be obtained, or use their ponchos or slickers. In cold weather and when fuel is plentiful the ground may be warmed by fires, the men making their beds after raking away the ashes.

1117. When troops are to remain in camp for some time, all underbrush is cleared away and the camp made as comfortable as possible.

1118. Watering troughs, shelter in cold weather and shade in hot are provided for the animals if practicable.

1119. To prevent stampeding in camp it will in most cases be sufficient for the men to go quietly among the horses at the first sign of fright and speak to them. If horses are stampeded, men should mount the fastest animals within reach, place themselves in front of the herd, and conduct it back to camp. With old horses the sounding of *stable call* may prevent or stop a stampede.

1120. One of the greatest difficulties of mounted organizations in campaign is to secure sufficient long forage. On this account the greatest attention should be given to grazing at every opportunity.

The horses are either held on the halter rope, picketed on the lariat, turned loose in inclosed pastures, or if there has been opportunity for sufficient training they may be herded.

Special effort should be made to give them an hour or two of grazing in the morning while the dew is on the grass (not clover), especially if the supply of hay at night has been short, and in such cases they should not be disturbed until the last moment, time lost being made up by more rapid marching.

Should the horses have to be protected from an enemy, they are taken out to graze under charge of an officer as soon as possible after camping. They are taken as far as is safe, so as to keep the nearer grass for night. It is occasionally practicable to arrange the camp so as to use the wagons and natural obstacles to inclose a space for night grazing.

1121. Special attention should be paid to the grooming of animals and to the condition of their feet and backs.

BREAKING CAMP.

1122. Camp will be broken in the following order: Immediately after **reveille** the men will feed their horses and, if time permits, groom for 20 minutes.

Tents will be struck and rolls made, which is followed by breakfast, then water call, followed by **boots and saddles.** The picket lines are placed upon the transportation and the organizations formed as directed.

PART XI.

CEREMONIES.

CHAPTER I.—GENERAL RULES.

1123. On occasions of ceremony, except funerals and reviews of large forces, troops will be arranged from right to left in line and from head to rear in column in the following order: First, Infantry; second, Field Artillery; third, Cavalry.

Artillery, Engineer, and signal troops, equipped as Infantry, are posted as Infantry; dismounted Cavalry and marines attached to the Army are on the left of the Infantry in the order named; companies or detachments of the Hospital Corps and mounted detachments of Engineers are assigned to places according to the nature of the ceremony; mounted companies and detachments of signal troops are posted as Cavalry. When Cavalry and Field Artillery are review together without other troops the Artillery is posted on the left. Troops in column in funeral escorts will be arranged from head to rear in the following order: First, Cavalry; second, Field Artillery; third, Infantry. In the same arm, regulars, militia in the service of the United States, and volunteers are posted in line from right to left or in column from head to rear in the order named. In reviews of large bodies of troops the different arms and classes are posted at the discretion of the commanding general, due regard being paid to their position in camp. On all other occasions troops of all classes are posted at the discretion of the commanding general, due regard being paid to their position in camp. On all other occasions troops of all classes are posted at the discretion of the general or senior commander.

1124. At formations for ceremonies in which signal organizations of different types take part, they are formed in order from right to left in line, and from front to rear in column, as follows: Field signal troops, telegraph signal troops, base-line signal troops.

1125. At formations for ceremony sabers are drawn. Mounted officers in facing toward the line and in resuming their front always execute a left about.

Staff officers, when it is not otherwise prescribed, draw and return saber with their chief.

1126. A noncommissioned officer in command of a company takes post on the right of the company in line with it. After aligning it he takes the post of the captain when the battalion is in column.

1127. Companies of battalions are formed and posted as previously prescribed.

CHAPTER II.—REVIEWS.

GENERAL RULES.

1128. The adjutant posts men or otherwise marks the points where the column changes direction, in such manner that its flank in passing the reviewing officer shall be about 10 yards from him.

1129. The post of the reviewing officer, usually opposite the center of the line, is marked by a flag.

The reviewing officer should be at the flag before the head of the column reaches that point; before that time he takes such position as he may desire to observe the movements of the troops.

1130. The staff of the reviewing officer is in single rank, 6 yards in rear of him, in the following order from right to left: Chief of staff, officers of the general staff corps, adjutant, aids, then the other members of the staff in the order of rank, the senior on the right; the flag and orderlies place themselves 3 yards in rear of the staff, the flag on the right.

Officers of the same or higher grade and distinguished personages invited to accompany the reviewing officer place themselves on his left; their staff and orderlies place themselves, respectively, on the left of the staff and orderlies of the reviewing officer; all others who accompany the reviewing officer place themselves on the left of his staff, their orderlies in rear. A staff officer is designated to escort distinguished personages and to indicate to them their proper positions.

1131. When riding around the troops, the reviewing officer may direct that his staff, flag, and orderlies remain at the post of the reviewing officer, or that only his personal staff and flag shall accompany him; in either of these cases the commanding officer alone accompanies the reviewing officer. If the reviewing officer is accompanied by his staff, the staff officers of the commander place themselves on the right of the staff of the reviewing officer.

1182. While passing in review or riding around troops the staff is formed in one or more ranks, according to its size.

The staff, flag, and orderlies of brigade commanders place themselves in the order prescribed for the staff, flag, and orderlies of the reviewing officer.

1183. When the general, the colonel, or the major faces the line to give commands, the staff and orderlies do not change position.

1184. When the reviewing officer is not in front or in rear of a regiment, or other separate organization, its commander may cause it to stand at ease, to rest, or to dismount and rest, and to resume attention and mount, but so as not to interfere with the ceremony.

1185. When the commanding officer of the troops turns out of the column, after saluting the reviewing officer, his post is on the right of the reviewing officer; his staff, in single rank, on the right of the staff already there; his flag and orderlies in rear of his staff.

When the rear element of his command has passed, the commanding officer, without changing position, salutes the reviewing officer, and then with his staff and orderlies rejoins his command. The commanding officer of the troops and his staff are the only ones who turn out of the column.

1186. If the person reviewing the command is not mounted, the commanding officer and his staff, on turning out of the column after passing the reviewing officer, dismount preparatory to taking post on the right of the reviewing officer and his staff. In such case the salute of a commanding officer prior to rejoining his command is made with the hand before remounting.

1187. If the post of the reviewing officer is on the left of the column, the troops march in review with the guide left; the commanding officer and his staff turn out of the column to the left, taking post as prescribed above, but to the left of the reviewing officer.

1188. Each guidon and, when the rank of the reviewing officer entitles him to the honor, each standard salutes at the command **HAND SALUTE**, and again in passing in review when 6 yards from the reviewing officer. The standard and guidons are raised at the command **TWO**, or when they have passed 6 yards beyond the reviewing officer.

1139. The band of each battalion, corps, or regiment plays while the reviewing officer is passing in front of and in rear of the organization.

During the march in review each band immediately after passing the reviewing officer turns out of the column across from the reviewing officer, takes post in front of and facing him, and continues to play until its organization has passed, then ceases playing and follows in rear of its organization; the band of the following organization commences to play as soon as the preceding band has ceased. The buglers of each organization, except those pertaining to the organization commanders, are consolidated in rear of the band.

1140. If the band be not present, the buglers of each organization, with the exceptions above noted, are consolidated and posted in single rank in a position corresponding to that of the band. They conform to what is prescribed for the band, the bugler chief taking post and performing the duties of the drum major.

This rule applies to all ceremonies.

1141. If the rank of the reviewing officer entitles him to the honor, the march or flourishes are sounded by the buglers when sabers are presented and sounded again in passing in review at the moment the standard salutes by the buglers halted in front of the reviewing officer.

Buglers with organization commanders do not sound the march or flourishes.

1142. The formation for review may be modified to suit the ground, and the ride around the line by the reviewing officer may be dispensed with.

1143. The reviewing officer, his staff, and others at the reviewing stand salute the standard as it passes, whether the standard salutes or not. The reviewing officer returns the salute of the commanding officer of the troops and of such commanding officer only.

1144. Mounted companies of signal troops may pass in review at increased gaits. When passing at an increased gait no salutes are made except by the commander of the troops when he leaves the reviewing officer.

1145. When the command is to pass at an increased gait the band (or buglers if no band is present) remains in front of the reviewing officer and continues to play until the column has completed its second change of direction after passing the reviewing officer. As soon as the increased gait is taken up by the column the band plays in appropriate time, ceasing when the column has again completed the second change of direction after passing the reviewing officer. Upon the completion of the review, the band returns to the position it occupied before marching in review or is dismissed, as may be directed. If there be more than one band, the band last in the column remains in the front of the reviewing officer; the others turn out of the columns when the increased gait is taken up by their respective organizations, and rejoin them, or are dismissed on the termination of the review.

1146. In reviews of brigades or larger commands each battalion, after its rear has passed the reviewing officer 50 yards, takes an increased gait for 100 yards in order not to interfere with the march of the column in rear.

1147. The troops, having passed the reviewing officer, return to their camps by the most practicable route, being careful not to delay the march of the troops in rear of them.

1148. When Signal troops are reviewed in line with Cavalry, Infantry, or Field Artillery, they are formed with the leading men aligned on the front rank of the Infantry or on the rank of Cavalry, or on the lead drivers of the Artillery.

1149. At the command **close ranks, MARCH**, with Infantry, or **ATTENTION; POSTS** with Cavalry or Field Artillery, the Signal troops commander commands: 1. **ATTENTION**, 2. **POSTS**. The chiefs of platoon and standard bearers resume their posts in line.

1150. The instrument, shop, and field wagons and the reserve wire carts do not accompany the companies at the review unless so ordered.

1151. When it is necessary that an organization should be reviewed by an inspector junior in rank to the commanding officer, the commanding officer receives the review and is accompanied by the inspector, who takes post on his left.

REVIEW OF A BATTALION OF SIGNAL TROOPS.

1152. The battalion being in line, the major faces to the front; the reviewing officer takes his post; the major turns about and commands: 1. **Prepare for review,** 2. **MARCH.** The staff remains in position, facing to the front.

At the command **MARCH,** the chiefs of platoons, and the standard bearers, if present with the standards, move up on the line of captains. Noncommissioned officers acting as chiefs of platoon do not move up.

The major then faces to the front.

1153. The reviewing officer moves a few yards toward the major and halts; the major turns about, commands: 1. **Hand;** 2. **SALUTE;** and again turns about and salutes.

The reviewing officer returns the salute, the major turns about, commands **TWO,** and again turns to the front.

1154. The reviewing officer approaches to within about 6 yards of the major, the latter salutes, returns saber, joins the reviewing officer, takes post on his right, and accompanies him around the battalion. The reviewing officer proceeds to the right, passes along the front of the officers to the left of the line, and returns to the right, passing in rear of the line. The reviewing officer and those accompanying him salute the standard when passing in front of it.

1155. On arriving again at the right of the line the major salutes, halts, and, when the reviewing officer and staff have passed, moves directly to his post in front of the battalion, faces it, draws saber, and commands: 1. **ATTENTION,** 2. **POSTS.** The chiefs of platoon and standard bearers execute a left about and take their posts in line. The major commands: 1. **By the right flank;** 2. **MARCH;** 3. **Battalion;** 4. **HALT.** The command **HALT** is given as soon as the sections have completed the turn.

1156. The column being formed, the major commands: 1. **Pass in review;** 2. **Forward;** 3. **MARCH.** At the command **MARCH,** the column moves off. Without command from the major, the column changes direction at the points indicated, and column of companies or platoons at full distance with guide to the right is formed successively to the left at the second change of direction. The major takes his post 24 yards in front of the column, immediately after the second change.

1157. When the major is 6 yards from the reviewing officer he and his staff salute, turning the head and eyes sharply to the right. When the major has passed 6 yards beyond the reviewing officer, he and his staff resume the carry, turning the head and eyes to the front.

The other officers and noncommissioned staff officers salute at the point prescribed for the major, turning the head and eyes as above described. Noncommissioned officers commanding platoons salute with the hand.

The reviewing officer returns the salutes of the major and of the standard only.

1158. The major, having saluted, takes post on the right of the reviewing officer, remains there until the rear of the battalion has passed, then salutes and rejoins his battalion.

1159. If the battalion is to pass around again at an increased gait, in order to keep the original first section at the head of the column each company should execute right by sections just before executing the first change of direction after passing the reviewing officer.

1160. When the battalion arrives at its original position in column the major commands: 1. **Trot (or Gallop)**; 2. **MARCH.**

The battalion passes in review as before, except that no salutes are rendered except by the major when he leaves the reviewing officer.

1161. The review terminates when the rear company has passed the reviewing officer; the band then ceases to play and rejoins the battalion or is dismissed. The major and his staff rejoin the battalion.

1162. The reviewing officer may prescribe how often the column shall pass in review and the gait or gaits to be used.

1163. When dismounted companies are present they will leave the column, at the direction of the major, before an increased gait is taken up.

1164. In the case of the review of a telegraph battalion, such variations as may be necessary in the minutiæ heretofore prescribed are authorized.

REVIEW OF A BATTALION WITH CLOSED INTERVALS.

1165. The battalion is formed in line, each company being at closed intervals. The review is conducted according to the principles previously explained, except that instead of first executing by the right flank the battalion is formed in column of companies with closed intervals but full distances, and passes in review in that formation.

1166. When space is limited the battalion may be formed in line with each company in platoon column. The review will be conducted on the general principles previously explained, the battalion passing in review either in platoon column or in column of companies at full distance, as before.

CHAPTER III.—INSPECTIONS.

SECTION I.—DISMOUNTED INSPECTIONS.

COMPANY INSPECTION.

1167. The company being in line, dismounted, as prescribed in paragraph **139**, the officers at carry saber, the captain causes the company to **open ranks** as prescribed in paragraph **142.**

1168. The captain then commands: **PREPARE FOR INSPECTION.**

The captain returns saber, inspects the chiefs of platoons and of sections, the ranks, and the file closers, beginning on the right of each and returning by the left and rear. Each man as approached executes **INSPECTION, PISTOL,** and after being passed by the inspector executes **RETURN PISTOL.** During the inspection of the ranks the lieutenants face about and stand at ease; they may be directed to accompany the captain or to assist in the inspection. Upon the completion of the inspection the lieutenants face to the front and resume the attention. The captain causes the company to **close ranks** as prescribed in paragraph 143.

1169. Should the inspector be other than the captain, the latter prepares the company for inspection and when the inspector approaches brings the company to attention, and from his post in front of the right of the company salutes. The salute acknowledged, the captain carries saber, faces to the left, commands: **PREPARE FOR INSPECTION,** and again faces to the front.

The inspection proceeds as before; the captain returns saber and accompanies the inspector as soon as the latter has inspected him.

1170. At inspection of quarters the inspector is accompanied by the captain and followed by the other officers, or by such of them as he may designate; the men, without accounterments, stand uncovered near their respective bunks; in camp they stand covered, without accouterments, in front of their tents; upon the approach of the inspector the first sergeant commands **ATTENTION**, salutes, and leads the way through the quarters or camp.

BATTALION INSPECTION.

1171. Battalion inspection will be conducted in accordance with the principles and by the methods and means laid down in Company Inspection, Dismounted, and Battalion Inspection, Mounted.

SECTION II.—MOUNTED INSPECTIONS.

1172. Organizations will be considered as mounted when the animal or motor transportation prescribed as a part of the equipment of the organization is present.

1173. Inspections will habitually be had mounted. Signal troops carry, for inspection mounted, every article that is prescribed as a part of the regular equipment and for which there is a specially designated place on the transportation.

COMPANY INSPECTION.

1174. The company being in line at normal intervals, the captain gives the proper commands for forming the men of the sections in line (in double rank in the cases of outpost and telegraph companies) in front of the section transportation.

He then draws saber and commands: 1. **Prepare for inspection**: 2. **MARCH**; 3. **FRONT.**

In the cases of outpost and telegraph companies the second command is preceded by the command **Open ranks.**

1175. At the first command the captain goes to the right of the company and takes post facing to the left, 8 yards in front of the guidon; and the bugler or buglers take post 2 yards to the right of and abreast of the guidon.

1176. At the second command the chiefs of platoons move forward 8 yards, and all men dress to the right.

The captain verifies the alignment of the chiefs of platoons of the men in line and of the transportation, returns to his post in front of the guidon on line with the chiefs of platoons, commands **FRONT**, and faces to the front.

The chiefs of platoons cast their eyes to the front as soon as the alignment is verified.

1177. As the inspector approaches, the men take the position of **Inspection pistol** and the buglers raise their bugles for inspection. Pistols are returned as soon as inspected.

1178. The inspector begins the inspection by passing around and inspecting the chiefs of platoons, who, after being inspected, face to the rear and remain at ease at their posts unless directed to assist in the inspection. The inspector then goes to the right of the company and inspects the buglers and guidon, after which he inspects each section in turn, commencing at the right flank, passing along the front of the section, and returning in the rear of the sections.

1179. To inspect the company more minutely the captain may cause such men as are mounted to dismount, and, without forming ranks, conducts the inspection.

1180. To inspect the technical signal equipment carried the captain dismounts all men, if not already dismounted, forms ranks, and commands: 1. **Inspection**; 2. **Equipment.**

At this command the horses of sections equipped with individual mounts are turned over to the horse holders, and the men fall in, in front of their horses. The chiefs of sections march the sections by the right flank of the sections to the rear of the transportation, faces them to the front, and commands **FALL OUT.**

The equipment is then removed from the transportation and placed upon the ground in such order as may be directed.

When the equipment has been laid out, the section will form in single rank in rear of the equipment, facing to the front.

1181. Upon the completion of the inspection of a section its equipment is replaced without command, and the section is formed and marched back to its proper place, where the men stand at ease until the completion of the inspection. All sections when not being inspected stand at ease awaiting the approach of the inspector, and are brought to attention by the chiefs of sections on his approach.

1182. In an animal-equipped company, when the captain dismounts the mounted men in the company, the guidon dismounts with them; the chiefs of platoons return saber, dismount, and stand to horse facing their platoons; the captain returns saber and dismounts, and his horse is held by a bugler. If the arms are not to be inspected the commands therefor are omitted.

1188. The chiefs of platoons, when the inspection of the rank begins, face toward the company and remain at ease, resuming front on the completion of the inspection of arms, or the captain may require them to assist him. If dismounted, their horses, if they be so mounted, are held by buglers. The captain may require each chief to inspect his own platoon, while he makes a general inspection.

1184. While inspecting the company or accompanying the inspector the captain does not return his saber while mounted; if dismounted, he returns saber.

1185. On the completion of the inspection the captain brings the company to attention and commands **POSTS.**

1186. In an animal-equipped company the captain gives the necessary commands for mounting the dismounted men before giving the command **POSTS.** The chiefs of platoons and the buglers execute an about, resume their posts, and face to the front. The captain then gives the necessary commands for resuming the normal formation.

1187. Should the inspector be other than the captain, the latter prepares the company for inspection and awaits the arrival of the inspector. Upon the approach of the inspector the captain at his post in front of the guidon salutes, the inspector returns the salute and informs him of the character of the inspection desired; the captain gives the necessary commands, faces to the front, and, when inspected, accompanies the inspector.

BATTALION INSPECTION.

1188. The battalion is formed in column of companies, each company in line. On the approach of the inspector the major commands: 1. **Prepare for inspection;** 2. **MARCH.**

The companies are prepared for inspection as already prescribed.

1189. The battalion staff officers place themselves in line with 1-yard intervals about 30 yards in front of the column, opposite the center, in order of rank from right to left; the noncommissioned staff form in a similar manner 6 yards in rear of the staff officers; the guard of the standard marches to the front and takes post 6 yards in rear of the center of the line of the noncommissioned staff. The major takes post in front of the center of the column 6 yards in front of the staff.

1190. Field and staff officers senior in rank to the inspector do not take post in front of the column, but accompany him.

1191. The inspector inspects the major and, accompanied by the latter, inspects the staff officers.

The major and his staff, as soon as inspected, return saber and accompany the inspector. The noncommissioned staff officers return saber when inspected.

1192. The inspector, commencing at the head of the column, inspects the noncommissioned staff and guard of the standard. The noncommissioned staff and guard of the standard may be dismissed as soon as inspected.

1193. The captain of each company not undergoing inspection dismounts such men as are mounted and brings the men to rest. As the inspector approaches the company the captain brings it to attention and, in the case of animal-equipped companies. mounts such mounted men as are dismounted; as soon as he himself has been inspected he gives the necessary commands, returns saber, and accompanies the inspector. The inspector proceeds as in company inspection. At its completion the captain commands **POSTS**, dismounts his mounted men, if not already dismounted, and brings the company to rest. Upon intimation from the inspector the major may direct that each company in turn be dismissed as soon as inspected.

1194. The battalion may be inspected in line. The inspection is conducted according to the same principles as when formed in column. The major and his staff are inspected at their posts in front of the center of the line; the band, which remains at its post on the right, is next inspected; then the companies in order from right to left.

1195. If the major is himself the inspector the inspection is conducted according to the same principles.

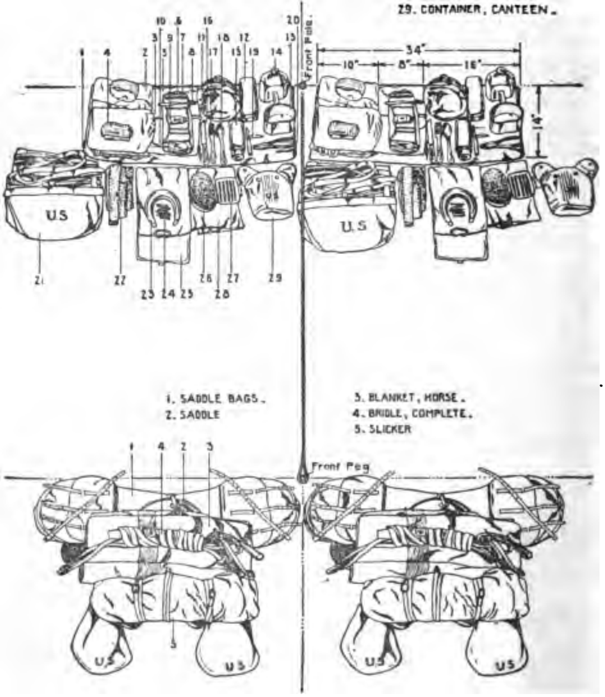
INSPECTION OF SHELTER-TENT CAMPS.

1196. To inspect an organization in shelter-tent camp the organization is caused to pitch a model camp in accordance with the provisions of Chapter III, Part X, each man displaying his equipment in front of his shelter tent, as shown in plate 14.

1197. Men equipped as Infantry omit the individual mounted equipment shown and place haversack and pack carrier, where saddle equipment is shown. Haversack is placed on the ground so that lettering thereon is read from the front and the pack carrier is placed on top of the haversack.

1198. As soon as equipment is disposed men take position 1 yard in front of the center of their tent halves, facing the front, and stand at ease. On the approach of the inspector the organization is brought to attention and aligned by the organization commander.

1. BLANKET, PACK.
2. UNDERSHIRT
3. DRAWERS.
4. SOCKS. TWO PAIRS.
5. TOWEL, HAND.
6. HOUSEWIFE.
7. COMB.
8. TOOTHBRUSH.
9. TOOTHPASTE
10. SOAP, CAKE.
11. MEAT PAN & LID.
12. BACON CAN
13. CONDIMENT CAN.
14. CANTEEN.
15. CUP.
16. KNIFE.
17. FORK.
18. SPOON.
19. ELECTRICIAN'S KNIFE.
20. POCKET PLIERS.
21. NOSE BAG & HAVERSACK.
22. SURSINGLE.
23. HORSESHOES, PAIR.
24. HORSESHOE NAILS.
25. GRAIN BAG.
26. BRUSH, HORSE.
27. CURRYCOMB.
28. GROOMING CLOTH.
29. CONTAINER, CANTEEN.



1. SADDLE BAGS.
2. SADDLE
3. BLANKET, HORSE.
4. BRIDLE, COMPLETE.
5. SLICKER

PLATE 14.—DISPLAY OF EQUIPMENT.

CHAPTER IV.—MUSTER.

1199. Muster is held in the order in line or in column of mpanies.

1200. The adjutant is provided with a muster roll of the adquarters and supply detachments; each captain, with the ll of his company. A list of absentees alphabetically arranged, owing the cause and place of absence, accompanies each roll.

1201. As the mustering officer approaches a company the cap-in commands: **Attention to muster.** The mustering officer or e captain then calls the names on the roll, and as each man's me is called he answers **here** and dismounts, or steps one pace the front, if dismounted.

1202. After muster the mustering officer verifies the presence the men reported absent from the formation, but in the post camp.

1203. The formation for dismounted muster of the company the same as for company inspection dismounted, the muster eing usually preceded by an inspection.

CHAPTER V.—FUNERAL ESCORT.

1204. The composition and strength of the escort are prescribed in Army Regulations.

1205. The escort is formed with its center opposite the quarters of the deceased, sections formed in line to the front; the band (or musicians) on that flank of the escort toward which it is to march.

1206. Upon the appearance of the coffin the commander of the signal troops of the escort commands: 1. **Hand**; 2. **SALUTE**, and salutes; the band plays an appropriate air; the command **TWO** is given and the escort is formed in section column.

1207. The procession is formed in the following order: 1. **Music**; 2. **Escort**; 3. **Clergy**; 4. **Coffin** and **pallbearers**; 5. **Mourners**; 6. **Members of the former command of the deceased**; 7. **Other officers and enlisted men**; 8. **Distinguished persons**; 9. **Delegations**; 10. **Societies**; 11. **Civilians.**

Officers and enlisted men (Nos. 6 and 7), with side arms, are in the order of rank, seniors in front.

1208. The escort marches at a walk to solemn music, and on arriving at the grave is formed in line with the center opposite the grave; the sections then form line to the front; the coffin is carried along the front of the escort to the grave; hand salute is given, and the band plays an appropriate air; the coffin having been placed over the grave, the music ceases, and hands are dropped to the side at command.

1209. After the coffin is lowered into the grave and the funeral services are completed, three volleys are fired with blank cartridges and a bugler sounds taps over the grave.

The escort is then formed into column, marched to the point where it was assembled, and dismissed.

1210. The band does not play until it has left the inclosure.

1211. The funeral ceremony for an enlisted man is the same as for an officer, except that the commands for saluting are omitted; the sergeant in command of the escort salutes with the hand on the appearance of the coffin at the quarters of the deceased and also when the coffin is carried along the front of the escort to the grave.

1212. When the distance to the place of interment is considerable, the escort, after leaving the camp or garrison, may march **at ease** until it approaches the burial ground, when it is brought to attention. The music does not play while marching **at ease.**

1213. In marching at attention the field music may alternate with the band in playing.

1214. When it is impracticable for transportation to approach the grave, it is left outside the inclosure. If the escort consists of signal troops only, all individually mounted officers and men dismount, turn over their horses to the horse holders, and the officers draw saber; a suitable formation is then taken and the coffin is escorted to the grave, where line is formed and the same ceremonies are performed as before prescribed. The ceremony at the grave having been completed, the command remains in line until the bugler sounds taps over the grave.

1215. Should the entrance to the cemetery prevent the hearse accompanying the escort till the latter halts at the grave, the column is halted at the entrance long enough to take the coffin from the hearse, when the column is again put in march. The cavalry, artillery, and signal troops of the escort, when unable to enter the inclosure, turn out of the column and salute the coffin as it passes.

1216. In all funeral ceremonies six pallbearers will be selected as far as practicable from the grade of the deceased. If the deceased is a commissioned officer, the coffin is borne by six commissioned officers; if a noncommissioned officer or private, by six privates.

1217. When arms are presented at the funeral of a general officer, the buglers sound the **march** or **flourishes**, according to the rank of the deceased, after which the band plays an appropriate air.

1218. At the funeral of a mounted officer or enlisted man, his horse, in mourning caparison, follows the hearse.

1219. When necessary to escort the remains from the quarters of the deceased to the church before the funeral service, the salute is given upon receiving the remains at the quarters and also as they are borne into the church.

1220. Before the funeral, the commander of the escort gives the clergyman and pallbearers all needed directions.

PART XII.

MISCELLANEOUS.

CHAPTER I.—THE GUIDON.

1221. The position of carry guidon, dismounted.—The lance of the guidon is held vertically in the right hand, thumb in front of the lance, forefinger along the side, ferrule about 6 inches from the ground. It is thus carried in marching.

When leading the horse the lance is held in a corresponding position in the left hand.

1222. The position of order guidon.—The ferrule of the lance rests on the ground on a line with and touching the toe of the right shoe; the right hand grasps the lance in the same manner as when at a carry.

1223. The position of parade rest.—The ferrule of the lance in on the ground as at the order; the lance is held with both hands in front of the body, left hand uppermost.

1224. To mount and dismount; the position of carry guidon, mounted.—At stand to horse the ferrule of the lance rests on the ground on a line with and touching the toe of the left shoe, lance vertical and supported by the left hand; hand at the height of the neck, elbow and forearm closed against the lance.

Preparatory to mounting, grasp the reins and a lock of the mane in the left hand, lance held in the same hand, reins on the near side of the lance; place the right hand on the pommel and mount in the usual manner. After mounting, grasp the lance with the right hand under the left, which lets go of it without quitting the reins; carry the lance to the right side, lower and place the ferrule in the stirrup socket. The right hand then grasps the lance, forearm nearly horizontal, the arms through the sling, lance vertical; this is the position of carry guidon, mounted.

Dismounting with the guidon is executed in a manner the reverse of the foregoing.

(NOTE.—Mounting and dismounting with the wire pike should be similarly executed.)

SALUTES.

1225. **Being mounted.**—Lower the guidon to the front until the lance (under the right arm) is horizontal.

Being dismounted.—Slip the right hand up the lance as high as the eye, then lower the lance to the front by straightening the right arm to its full extent.

If marching, the salute is executed when at 6 yards from the officer entitled to the salute; the carry is resumed after passing 6 yards beyond him.

At the halt the salute is executed at the command 1. **Hand,** 2. **SALUTE.** The carry is resumed at the command **TWO.**

CHAPTER II.

THE STANDARD.

1226. Whenever in these regulations the term **the standard** is used it includes both the national and the battalion standards; if either alone is to be referred to, the term **the national standard** or **the battalion standard** is used.

The manual of the standard is as prescribed for the guidon, except that at carry standard, dismounted, the ferrule of the lance is supported at the right hip.

The standard salutes an officer entitled to the honor, but in no other case.

1227. The guard of the standard.—The guard of the standard consists of the color sergeants and of two experienced men selected by the major. The guard is habitually formed in line, the color sergeants in the center.

The national standard is carried by the senior color sergeant, who is nearest to the right flank of the guard and who commands the guard. The Signal Corps standard is carried by the other color sergeant. The latter conforms to the movements of the former, maintaining his position on the left.

The standard, kept at the quarters or office of the commanding officer, is escorted by the guard to the place of formation of the battalion and is similarly returned.

1228. Post of the standard.—At the formation of the battalion, as soon as the companies have taken their places, the guard of the standard takes post midway between the two center or right center companies, in line, abreast of the front ranks of the sections; in column, at the center of the column.

If the formation of the battalion is changed from line to column, or the reverse, the standard conforms to the movement, taking its new position by the most direct route.

When during exercises the battalion formation is broken up the standard joins the commanding officer or is dismissed, as may be directed by the adjutant.

CHAPTER III.—THE SABER.

1229. Officers are armed with the saber.

At ceremonies sabers are habitually drawn. In route marches they are habitually in the scabbard. At other times they are drawn or in the scabbard, in the discretion of the officer in command; when he draws or returns saber, officers and noncommissioned staff officers under his command draw and return saber with him.

1230. For dismounted duty the saber is attached to the belt, and is kept hooked up, except when drawing and return saber.

1231. For mounted duty the saber is habitually attached to the left side of the saddle; in full dress it is attached to the belt, unless otherwise directed by the commanding officer. The saber is not removed from the saddle when dismounting temporarily for the performance of some duty on foot.

1232. To draw the saber.—Unhook the saber with the thumb and first two fingers of the left hand, thumb on the end of the hook, fingers lifting the upper ring; grasp the scabbard with the left hand at the upper band, bring the hilt a little forward, seize the grip with the right hand and draw the saber quickly, raising the arm to its full extent to the right front at an angle of about 45° with the horizontal, the saber, edge down, in a straight line with the arm; make a slight pause and bring the back of the blade against the shoulder, edge to the front, arm nearly extended, hand by the side, elbow back, third and fourth fingers back of the grip; at the same time hook up the scabbard with the thumb and first two fingers of the left hand, thumb through the upper ring, fingers supporting it; drop the left hand by the side. This is the position of **carry saber** dismounted.

1233. To draw the saber when mounted, reach with the right hand over the bridle hand, and, without the aid of the bridle hand, draw the saber as before. The right hand at the carry rests on the right thigh.

1234. The saber if drawn is, while at attention, habitually held at the carry, except when dismounted and moving in double time; in the latter case it is carried diagonally across the breast, edge to the front, the left hand steadying the scabbard.

1285. Being at carry saber: 1. **Present,** 2. **SABER.**

For officers: At the command **present** raise and carry the saber to the front, base of the hilt as high as the chin and 6 inches in front of the neck, edge to the left, point 6 inches farther to the front than the hilt, thumb extended on the left of the grip, all the fingers grasping the grip. At the command **SABER** lower the saber, point in prolongation of the right foot and near the ground, edge to the left, hand by the side, thumb on left of grip, arm extended. If mounted, the hand is lowered behind the thigh, point a little to the right and front of the stirrup.

1286. Being at present saber: 1. **Carry,** 2. **SABER.**

At the command **SABER**, resume the position of carry saber.

1287. Being at carry saber: 1. **Parade,** 2. **REST.**

Take the position of parade rest (paragraph **70**), point of saber on or near the ground in front of the center of the body, edge to the right.

At the command **attention**, resume the carry saber and the position of the soldier.

1288. To return saber: **Carry the right hand opposite to and** 6 inches from the left shoulder, saber vertical, edge to the left; at the same time unhook and lower the scabbard with the left hand and grasp it at the upper band; drop the point to the rear and pass the blade across and along the left arm; turn the head slightly to the left, fixing the eyes on the opening of the scabbard, raise the right hand, insert and return the blade; turn the head to the front, drop the right hand by the side, hook up the scabbard with the left hand, drop the left hand by the side.

When mounted the saber is returned without using the left hand.

CHAPTER IV.—HONORS.

1239. The national or battalion standard, uncased, passing a guard or other armed body will be saluted, the field music sounding "to the standard." Officers or enlisted men passing the uncased standard render the prescribed salute; with no arms in hand, the salute will be the hand salute, the head dress not to be removed.

1240. Whenever the national anthem is played at any place when persons belonging to the military service are present, all officers and enlisted men not in formation shall stand at attention facing toward the music (except at retreat, when they shall face toward the flag). If in uniform, covered or uncovered, or in civilian clothes, uncovered, they shall salute at the first note of the anthem, retaining the position of salute until the last note of the anthem. If not in uniform and covered, they shall uncover at the first note of the anthem, holding the headdress opposite the left shoulder and so remain until its close, except that in inclement weather the headdress may be held slightly raised.

The same rules apply when "To the Color" or "To the Standard" is sounded as when the national anthem is played.

When played by an Army band, the national anthem shall be played through without repetition of any part not required to be repeated to make it complete.

The same marks of respect prescribed for observance during the playing of the national anthem of the United States shall be shown toward the national anthem of any other country when played upon official occasions.

1241. No honors are paid by troops when on the march or in trenches, except that they may be called to attention, and no salute is rendered when marching in double time or at the trot or gallop.

1242. The commanding officer is saluted by all commissioned officers in command of troops or detachments. Troops under arms will salute as prescribed in drill regulations.

1243. When making or receiving official reports or on meeting out of doors all officers will salute. Military courtesy requires the junior to salute first, but when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior—as, for example, to the adjutant, officer of the day, etc.—the officer making the report, whatever his rank, will salute first; the officer to whom the report is made will acknowledge by saluting that he has received and understood the report.

1244. Salutes shall be exchanged between officers and enlisted men not in a military formation, nor at drill, work, games, or mess, on every occasion of their meeting, passing near, or being addressed, the officer junior in rank or the enlisted man saluting first.

1245. When an officer enters a room where there are several enlisted men the word "attention" is given by some one who perceives him, when all rise, uncover, and remain standing at attention until the officer leaves the room or directs otherwise. Enlisted men at meals stop eating and remain seated at attention.

1246. An enlisted man, if seated, rises on the approach of an officer, faces toward him, stands at attention, and salutes. Standing, he faces an officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease work to salute an officer unless addressed by him.

1247. Before addressing an officer an enlisted man makes the prescribed salute with the weapon with which he is armed, or, if unarmed, with the hand. He also makes the same salute after receiving a reply.

1248. In uniform, covered or uncovered, but not in formation, officers and enlisted men salute military persons as follows: With arms in hand, the salute prescribed for that arm (sentinels on interior guard duty excepted); without arms, the hand salute.

1249. In civilian dress, covered or uncovered, officers and enlisted men salute military persons with the hand salute.

1250. Officers and enlisted men will render the prescribed salutes in a military manner, the officer junior in rank or the enlisted man saluting first. When several officers in company are saluted, all entitled to the salute shall return it.

1251. Except in the field under campaign or simulated campaign conditions, a mounted officer (or soldier) dismounts before addressing a superior officer not mounted.

1252. A man in formation shall not salute when directly addressed, but shall come to attention if at rest or at ease.

1253. Saluting distance is that within which recognition is easy. In general, it does not exceed 30 paces.

1254. When an officer entitled to the salute passes in rear of a body of troops, it is brought to attention while he is opposite the post of the commander.

1255. In public conveyances, such as railway trains and street cars, and in public places, such as theaters, honors and personal salutes may be omitted when palpably inappropriate or apt to disturb or annoy civilians present.

1256. Salutes to the national anthem or when "To the Color" (or "Standard") is sounded during ceremonies will be as prescribed in regulations.

1257. Officers and enlisted men passing the uncased color will render honors as follows: If in uniform they will salute as required in paragraph **75**; if in civilian dress and covered they will uncover, holding the headdress opposite the left shoulder with the right hand; if uncovered they will salute with the hand.

1258. An enlisted man, armed with the saber and out of ranks, salutes all officers with the saber if drawn; otherwise he salutes with the hand. If on foot and armed with a rifle, he makes the rifle salute.

1259. Sentinels on post doing interior guard duty conform to the foregoing principles, but salute by presenting arms when armed with the rifle. They will not salute if it interferes with the proper performance of their duties.

1260. Commanders of detachments or other commands will salute officers of grades higher than the person commanding the unit by first bringing the unit to attention and then saluting as required in paragraph **1242.** If the person saluted is of a junior or equal grade the unit need not be at attention in the exchange of salutes.

1261. If two detachments or other commands meet, their commanders will exchange salutes, both commands being at attention.

1262. Salutes and honors as a rule are not paid by troops actually engaged in drill, on the march, or in the field under campaign or simulated campaign conditions. Troops on the service of security pay no compliments whatever.

1263. If the command is in line at a halt (not in the field) it shall be brought to **Hand salute** before its commander salutes in the following cases: When the national anthem is played, or when "To the Color" or "To the Standard" is sounded during ceremonies, or when a person is saluted who is its immediate or higher commander or a general officer, or when the national or battalion standard is saluted.

1264. At ceremonies, under arms, the command shall render the prescribed salute and shall remain in the position of salute while the national anthem is being played; also at retreat and during ceremonies when "To the Color" is played if no band is present. If not under arms, the organizations shall be brought to attention at the first note of the national anthem, "To the Color," or "To the Standard," and the salute rendered by the officer or noncommissioned officer in command as prescribed.

1265. Soldiers at all times and in all situations pay the same compliments to officers of the Army, Navy, Marine Corps, and Volunteers, and to officers of the National Guard in uniform as to officers of their own regiment, corps, or arm of service.

CHAPTER V.—PROFICIENCY TEST FOR COMPANIES OF SIGNAL TROOPS.

1266. Companies of signal troops should be tested technically and administratively from time to time by specially qualified signal officers, preferably of field rank. These tests act as stimulants to the work of the companies and make possible a very accurate rating of them as regards their efficiency in the performance of field duty.

1267. The test outlined is prescribed as a guide; suitable variations from it should be employed if necessity therefor arises.

1. Individual test:

(*a*) Telegraphy, wire or radio. Rating as to ability to send and receive regular messages in speed of words per minute. Office practice. Message forms, checks, blanks, and rules pertaining to telegraph operation and the handling of messages.

(*b*) Visual signaling: Wigwag—rate per minute sending and receiving code. Visual signaling: Semaphore—rate per minute sending and receiving code.

(*c*) Lineman (wire and outpost companies): General duties, tying, splicing, cutting in. Lineman (telegraph companies): Details of semipermanent and permanent telegraph and telephone construction.

(*d*) Radio operation (radio companies): Adjustments, nomenclature, and care of apparatus.

(*e*) Telephony (outpost and telegraph companies): Telephones and telephone switchboards. Operation, adjustment, and repairs.

(*f*) Motor vehicles (telegraph companies): Operation, adjustment, and repairs.

(*g*) First aid and personal hygiene.

(*h*) Care of arms and equipment.

2. Section (platoon outpost companies) test: To include the handling of the section in a simple practical problem calculated to test the efficiency of the section, both technically and in self-maintenance in the field.

3. Company test:

(*a*) Technical inspection (with full packs): Drill, horsemanship, marching, camping, inspection of arms and equipment.

(*b*) Administrative inspection: Condition of records, mess administration, stable management.

(*c*) Field problem: An advanced problem in the establishment of lines of information under given tactical conditions. Organizations as a whole to be rated as to methods and results.

4. Special test: Examination of specially qualified enlisted men.

(*a*) Heliograph: Setting up and adjustments. Sending and receiving.

(*b*) Acetylene lantern: Setting up and adjustments. Sending and receiving.

(*c*) Code and cipher: Knowledge and use of cipher disk.

OCT 1 [illegible] 1917